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MOBILITY AND QUALITY OF LIFE

by

William Warren Munroe, B.A. (Honours)

A thesis submitted to
the Faculty of Graduate Studies
in partial fulfillment of
the requirement for the degree of

**Master of Arts
Department of Geography and Environmental Studies**

**Carleton University
Ottawa, Ontario
July 25, 2001
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acceptance of the thesis

MOBILITY AND QUALITY OF LIFE

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the degree of Master of Arts

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ABSTRACT

There is a great deal of interest in health and quality of life issues. Medicare costs are said to be too high, the service is said to be inadequate, and the health care system is under review. The percentage of elderly is growing and services may have to be expanded to meet increasing demand. Health planners are reviewing demographic information and health related issues in order to be better prepared for change. Curiously, the role of mobility for the elderly is often ignored when looking at health and quality of life issues.

The purpose of this thesis is to highlight the importance of mobility when looking at health and quality of life issues particularly for the elderly. In order to explore the role of mobility, this thesis focuses on two components; 1) structure and 2) behavior. The structural component addresses the question of whether there is variation in mobility particularly in relation to urban and rural settings. The behavioral component addresses the question of whether health related behavior is correlated with mobility.

For the structural component, census data (1996) for Ontario are used to calculate net and gross mobility values. Net mobility values are used to define attractive and unattractive areas. Gross mobility values are used to define stable and high turnover areas. Maps are generated showing a great deal of variability in mobility between areas. Core and peripheral areas are unattractive while middle density areas in close proximity to services are attractive. Yet, rural dwellers appear not to move to the same places as urban dwellers.

For the behavioral component, national population health survey (NPHS) variables (1996-97) for Ontario are used as indicators of health related behavior. These are compared to net and gross mobility values using Pearson's correlation coefficients. The results suggest that people moving to attractive areas appear to be interested in maintaining good health. As well, the fragmentation of social support networks and high use of alternative health care providers are found to be related to gross mobility. Although this thesis is primarily descriptive and exploratory, it does highlight the importance of mobility when considering health and quality of life issues for the elderly.

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None of this would have happened, nor been worthwhile, without the support and conviction of my better half, Laura and my wonderful children.

Epigraph

Many objects in nature show such beauty, such symmetry and unity, as almost to drive us to the notion of supernatural design. But....the appearance of external design is not a conclusive proof of Providence. The theologians who use the idea so much should abandon it, and the scientists who have abandoned it should use it; it is a magnificent clue, and leads to hundreds of revelations. For there is design, the design of the parts by the whole; and if science will interpret the parts of an organism in terms of their meaning for the whole, it will have an admirable balance for that other heuristic principle - the mechanical conception of life - which also is fruitful for the discovery, but which, alone, can never explain the growth of even a blade of grass.

Will Durant, *The Story of Philosophy*

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PREFACE

This inquiry began as a result of my involvement in running and subsequently promoting community gardens. I suppose because gardening is thought to be a healthy activity particularly for the elderly, we, the community gardeners, received many overtures from public health workers to join forces to help neighborhoods get these things 'on the ground'. While attending meetings with community health center staff, I was exposed to a dizzying array of studies on health. One of these reports, by the Health Information Partnership for the Eastern Ontario Region, provided a demographic profile based on the 1996 census. The report covered the usual descriptors such as income, and education, etc., graphing and mapping the results. The last variable discussed was mobility which the author of the study considered unimportant. She supported this assertion by saying that residential mobility over the five years prior to the census was the same throughout the region and also throughout the province, running at around 20%.

In the gardens, in the neighborhoods in which I worked, however, mobility certainly was important. Some neighborhoods were ports for international immigrants who rented apartments and soon moved again in favor of 'better' places to raise their families. The transient nature of these places made it difficult to start and run community gardens, though there was a considerable degree of support for this activity amongst the

residents. Transient neighborhoods seemed to have other difficulties as well, including neglect and in some cases abuse, both social and environmental. Mobility, therefore, may indicate an opportunity to improve one's standard of living but also impacts on the quality of life in some neighborhoods.

Could it be that these subtleties were missed using census data? Was it true that mobility was the same everywhere, or were its effects indistinguishable using aggregated data? From what I could see at the ground level, there were effects and there were variations. People moved into the country through particular areas in the city, while other areas were relatively stable. From within the country, people were drawn to the city from the rural areas for work and education and many moved out upon retirement. With the baby boomers nearing retirement age, the possibility of this mobility must be a concern for health planners, if only to be prepared for changes in demand for health services. Surely, the data, however cumbersome, would show that some areas were more attractive than others as retirement destinations.

What would be interesting to see, it seemed to me, would be whether mobility highlights or points to differences in behavior related to health and quality of life issues and thus support or refute my conjectures which were based on anecdotal observations. Stable communities might have stronger social support networks offering people help during difficult times, while people in high turnover areas might place more demands on public and private services. Perhaps people who have weak social networks are more open to trying alternatives while those in stable areas were more resistant to change. With respect to community gardens, they tended to be accepted in transient areas but not so accepted in established and stable neighborhoods. There also seemed to be a

difference between attractive areas and unattractive areas. People who moved into attractive parts of the city seemed to be interested in quality of life issues (and able to do something about it) and were more proactive about health. They seemed to be involved in different types of activities as well, including gardening.

With so many elements intertwined at the local level, I felt that an overview might help provide a better understanding of the processes at work. First, it would be helpful to re-examine the census data to determine if there was variability in mobility, at least by broad age groups. Then, if possible, it would be helpful to examine behavior related to health issues, and compare these with mobility to determine whether any associations exist. Are people in high turn-over areas more open to trying alternative health care services while those in stable areas may be more resistant to change? Are people in attractive areas more proactive about health?

Therefore, it would be important to take a look at *health and quality of life* issues, particularly for the *elderly*. Also, it would be important to find out what constitutes *mobility* and how it is defined and formulated. Since it seemed that the mobile elderly moved into town, while others moved out of town, an examination of *urban/rural* mobility would provide some structure to the exploration when looking at the regional and provincial level. This thesis is my first attempt at sorting out and clarifying some of these issues.

CHAPTER ONE

OVERVIEW AND PURPOSE

The average age of Canadians is rising and the demand on health care services will therefore likely increase (Moore & Rosenberg, 1997). 'Baby boomers' are nearing retirement and the health care system will likely have to undergo some important adjustments in order to address the needs of the changing population. In the mid 1990s, baby boomers made up 60% of the population (Miller, 1995). As they age, not only will they increase the demand for health care, but they will also likely be able to acquire it through their influence on policy making. Attempts are already being made to address the need for changes to health care services. A shortcoming in the policies made today for things happening in the future may be the assumption that the elderly are not inclined to move.

It has been suggested that the vast majority of the elderly remain in situ (Moore and Rosenberg, 1997). Statistics are said to show that only 20 % of those over the age of 65 ever move (Che-Alford & Stevenson, 1999). A study by the Health Information Partnership for the Eastern Ontario Region states that residential mobility for all ages was the same throughout the region and also throughout the province, running at around 20%. Mobility was therefore not considered to be important. However, there are indications that mobility for the elderly is increasing (Golledge, 1997). When a larger percentage of

movers is combined with the increased numbers of elderly, the delivery of health care services may be affected. As well, the potential impact of the increasing numbers of mobile elderly on the landscape should be considered. Baby boomers have been blamed for urban sprawl and the growth of suburbia (Foot & Stoffman, 1996). They may once again change the complexion of the landscape as they make adjustments to the environment to suit their changing needs as they age. The purpose of this thesis though is to answer *whether mobility is important to consider when looking at health and quality of life issues*. This inquiry benefits from an examination of two major elements; one structural and the other behavioral. The former addresses *whether there is variability in mobility for the elderly particularly in relation to urban and rural settings*. The latter examines *whether mobility is related to health and quality of life issues*.

Foot and Stoffman suggest that there will be an “acceleration of the movement of the baby boomers away from the urban areas” particularly since “the call of the wild is deeply ingrained in the Canadian psyche” (Foot & Stoffman, 1996, p. 37). For some, this may mean living on a trap line or homesteading. Yet, access to the services and facilities available in the core will remain important as people seek a place where they can enjoy the best of both worlds. This movement away from core areas has already begun with some people building their larger homes in four season resort locations where they can work and play, traveling to the city as needed. Examples of favorable locations are two of the fastest growing communities in the country, Whistler in British Columbia and Mont Tremblant in Quebec. Other less expensive rural areas may also be attractive. Moves out of core areas may be followed later by a return to central services for support.

In response to the increased needs for medical and social services greater emphasis is being placed on health as life style (Ministry of Health and Long-Term Care, Ontario, 2000). Indeed, for the elderly life style and quality of life are important factors in choosing where to retire (Loomis et al., 1989, pp. 19 - 35). The Ministry of Health encourages people to maintain good health through activities and early detection of problems, before they require costly secondary or tertiary treatment by medical professionals. Technological innovations as well as alternative forms of health care are seen to have the potential to reduce costs (Pelletierfleury, 1997, pp. 1 - 14; Lovell, 1999, pp. 9 - 22). In order to reduce hospital expenditures, stays have been shortened, moving short-term and, in some cases, long-term care into the home. Social support networks are seen to be an important source of care. The suggestion is, the stronger the family and community support network, the less the burden on the health care system. Yet it has been suggested that the stronger the social ties, the more resistant people are towards innovation and change (Fisher, 1977).

Therefore, both a structural and a behavioral question arises when considering the role of mobility in relation to health and quality of life issues for the elderly. First, the structural question asks: 'where will the movers move?' And second, the behavioral question asks: 'will those who move behave differently from those who stay settled?'

Since there may be a general trend of movement out of core areas in favor of the countryside and back later in need of support, urban/rural interactions will be explored. Those who move may be interested in improving quality of life and be more proactive towards health. They may also participate in different activities from those who do not

move. People in stable areas may enjoy strong social support networks but may not be as accepting of change as those living in high turn-over areas

By using standardized net and gross mobility data we can examine areas in terms of attractiveness and unattractiveness, as well as stability versus high turnover. We can examine whether core areas are no longer attractive to people when they retire. On the other hand, we can examine whether isolated areas are no longer attractive as well. It is not unreasonable to expect that middle density areas are attractive to both retiring urban and rural dwellers. By looking within regions at municipalities we can examine whether movers from the core areas and those from peripheral areas move to the same places. The possible differences in residential locations between urban and rural retirees is important to consider since health care dollars may move with large absolute numbers while areas with relatively high percentages of elderly may not be recognized (Golant, 1984). Will there also be segregations between urban in-migrants and the rural 'locals'? Not only may there be differences between incomers and locals, but those who have worked in urban settings may not mix readily with those who work with their hands. Studies have shown that a duality in this respect exists and is common in cities (Mollonkopf & Castells, 1991). Golledge suggests 'highly differentiated housing markets have developed with non professional, lesser skilled workers being segregated and pushed into lower land-cost areas on the fringe of cities' (Golledge, 1997, p. 142). Perhaps closed retirement communities in rural areas, attractive to urbanites, are an extension of this characteristic. Also, Golant (1985) points to the possible segregation between age groups and the tensions arising from zoning.

Mobility towards middle density areas, within reach of amenities, may occur but this process says little of health and quality of life. Human activity and decision making processes are vital to a study of mobility and quality of life. Variables which exemplify health related behavior may be related to differences in mobility. Those who are seeking a healthy life style may be more proactive and interested in activities which are thought to promote health. Use of public and private services may increase in attractive areas as incomers may not belong to strong social support networks. Incomers may also be more accepting of changes occurring in health care provision while those with strong ties may be less flexible and less open to alternatives.

A study of mobility and quality of life benefits from an examination of both spatial structure and spatial behavior. A study of structures (core to periphery) tells little about human behavior, although we can make inferences. On the other hand, a study of behavior without including structural components is equally bereft. Many authors including Zelinsky (1971), Smith (1979), Hughes and McCormack (1985) (1987), Rogers (1992), Gordon (1992), and Golledge (1997) have addressed the issues of links between spatial structure and behavior. This thesis simply looks at the possible association between behavior of people and place without claims of causation. Yet, this exercise may point to important elements which may help guide further studies, as well as provide helpful information aimed at refinements in policy making.

Two data sources are used to test possible associations between mobility and health related behavior: 1996 census data for mobility, and the 1996 –97 national population health survey (NPHS) data for health related behavior. The census data include both 'in' and 'out' mobility which is used to calculate net (in minus out) and gross

(in plus out) values. Net migration receives by far the greatest attention in the literature. When gross migration is discussed, it is as an aside to net migration and not explored for what it might reveal. Perhaps, this is a consequence of an inclination towards considering economic impacts versus social cohesion. Net mobility or population change due to factors other than births and deaths is calculated using 'in' minus 'out' numbers for an area (see chapter 3). This of course does not recognize places with high in and high out mobility, considering them to be the same as places with low or no mobility. But by standardizing both 'in' minus 'out' and regressing it against 'in' plus 'out' we can consider both net and gross mobility.

These data are examined at three levels of aggregation, census sub-division (CSD) also known as municipalities, census division (CD) also known as counties, and district health unit (DHU) which are in some cases much larger than counties, to watch for variation in the results across scale. This is important because "aggregation is perhaps the number one bogey of migration research" (Greenwood et al., 1991, pp. 237-270). Using macro data to describe and possibly predict aggregate population flows using census data variables has "provided limited explanation or understanding of the motivational basis of the decision [to migrate] by individuals and households" (Golledge, 1997, p. 448). Therefore, moving to the local level and using disaggregate methods may help improve the inquiry. In this thesis, the study moves to the CSD level, pushing the limits of usefulness of aggregate data. Macro moves are more about places than about people as there is no such thing as a net nor a gross migrant (De Jong & Fawcett, 1979). Mobility should not only be researched in terms of motivations, but should include an

awareness of its possible impacts particularly on interactions. Social and environmental ties may be influenced by rates of mobility.

The structural component of the study starts with maps of stable versus transition areas and attractive versus areas in dissolution using standardized net and gross mobility values. Health related behavior indicators found in the NPHS cover the subjects of types and levels of activity, social support networks, flexibility, proactivity, and access to health care. These are tested for covariance against net and gross mobility. Statements of causality are approached with caution as the thesis is primarily exploratory. This inquiry benefits from a look at urban and rural interactions, health and quality of life, demographics, and mobility. Issues regarding the use of structure in tandem with behavior are also explored.

Mobility and quality of life is a broad topic. This inquiry focuses on residential mobility and health aspects of quality of life, although variations in attractiveness of areas may imply the importance of environment in what makes up quality of life.

CHAPTER TWO

THEORETICAL CONSIDERATIONS

This chapter looks at five topics. It starts with urban/rural contrasts which highlights dichotomies and continuums between core and peripheral areas. This is followed by an examination of health as it relates to quality of life and vice versa. Herein, the emphasis moves from treatment and cure to activity and life style. The focus on the elderly requires an examination of the applicability of 'life cycle' versus 'life course' for age cohorts. It is important to consider the validity of the nominalization of the elderly as maintaining undying characteristics or whether these characteristics change with the spirit of the times. Mobility itself must be addressed as it is a relative concept requiring attention to both time and space. In order to bring together topics of mobility and quality of life for the elderly in relation to urban and rural settings, this chapter closes with a discussion of the tenuous bridge between structure and behavior.

2.1 Urban Rural Contrasts

The contrast between urban and rural settings has provided a rich area of study of human to human interaction in relation to human interaction with the environment. From 'Pan', in classical mythology, to the 'adventurer to far off lands', images of the 'undomesticated' and 'uncivilized', or more accurately the 'uncitified', have served to elicit fear, and provoke romanticism. Yet, a reflexive relationship seems to exist between these extremes. For example, troubles in core areas have led to moves into hinterlands, while

at other times, core areas have provided opportunities. As recently as the late nineteen sixties and early seventies there was a back to the land movement in North America precipitated by American military activity in Vietnam and subsequent conscription. Many of the 'draft dodgers' moved into Canada, to avoid the state's edict. When looking at the movement into Canada by Americans during the 1970s, sociologist A. Michalos does not mention draft dodgers but does quote the U.S. News and World report as stating that Canada was attractive for its 'frontier spirit and vast stretches of nearly uninhabited terrain' (Michalos, 1984). Yet, although Canada covers a large land area, the majority of its citizens live in urban settings, making Canada one of the most 'urbanized' countries in the world. So, is Canada urban or rural?

2.1.1 Defining 'Urban' and 'Rural'

Perceptions of what constitutes urban or rural vary considerably from one country to the next. Most countries employ a measure of the amount of manufacturing versus agricultural activity without taking into consideration the population density of a place. Canada is one of a minority of countries that utilizes the number of people per area (km²) in defining urbanity. Settlements of more than 1000 people with a density of 400 people per square kilometer or more are considered urban in Canada. Rural is then defined as that which is not urban or everything else. Yet, a definition of whether a place is rural or urban is relative as there is no single absolute measure of the difference. The United Nations concluded in 1952 that "there is no point in the continuum from large agglomerations to small clusters or scattered dwellings where urbanity disappears and rurality begins" (United Nations, 1955). Although the suggestion is that there is a continuity between the two, they are also dichotomous. There is "some sort of

dichotomous continuum from truly rural to truly urban communities" (Cloke, 1977, p. 34). This makes measurement difficult.

A relationship does exist between urban cores and the surrounding rural periphery. It is one where access to an abundance of resources allows for population concentration and the specialization and differentiation of labor activity. An urban area is then a "concentration of differentiated but functionally integrated specialization" (Lampard, 1965, pp. 519-20). The refinement of raw resources with the need for spatial association begins to define urban core areas (Childe, 1950). Besides having an economic foundation, cores also require a degree of social interaction and therefore social integration and ordering. This draws attention to the possibility of a relationship between social ordering and spatial ordering.

Peripheral areas are then defined in relation to core areas. In this manner, peripheral areas might be described as areas of relative homogeneity in terms of labor activity, as well as areas of lower population and density. Yet, in order to remain true to the hypothesis put forward by Cloke regarding the dichotomous nature of the subject, it is helpful to consider the possibility of variation in rural settings and homogeneity in urban settings, for this must be an exercise in perception. It was not long ago in Canada when the skill required in hunting for furs and to eke out an existence 'on the land' could not be matched by domesticated urban dwellers. In urban areas there is a great deal of conformity resulting in usually one official language for administration, accepted and expected norms of conduct and laws. The difference between urban and rural life may best be seen in terms of control over natural processes. Those living 'on the land' contend more directly with nature's extremes, while cities attempt to remove these variations in

preference for 'human standards'. This suggests that urban dwellers have more in common with each other than they do with rural dwellers, and vice versa.

Peripheral areas require an emphasis on nature and natural processes. They tend to require a greater degree of physical activities and are therefore often considered relatively primal. Urban areas tend to provide venues for the refinement of raw resources (factories) and human passion (cultural exhibits). Indeed, many poets and prose writers have used these dichotomies to exemplify thoughtfulness over willfulness, while the opposite may also occur. Again, the image of Pan coming to town for merriment making and leaving the place in ruination comes to mind. Of course these extremes are not always separate as occasionally there is a mix. Interestingly, this mix is sometimes a source of contention. For example, in Canada, the children of French and Indian parents are 'Metis' while the children of British and Indian parents were referred to as 'half breeds', and today are not referred to as distinct.

For some people 'the country' has a reputation of being peaceful and pure. It is considered clean and unpolluted and not yet corrupted by human activity. Juxtaposed with this vision is the awareness that life in rural areas requires a measure of practicality and pragmatism while urbanity may encourage romantic notions of country life. These cultural and ideological perspectives slide along the 'dichotomous continuum' in tandem with economic and social definitions. An awareness of these perspectives when defining urban and rural is helpful as we move from objective to subjective information and remain conscious of the importance of both. Urban and rural areas experience exchanges of resources and tools, as well as attitudes and opinions.

2.1.2 Fluctuation

The tension between urban and rural is not static. Urban areas can grow some times but also suffer declines at others. For example, between 1991 and 1996, 150,000 more people moved out of Toronto than moved in from other parts of Canada (Statistics Canada, 1996). People tend to move shorter rather than longer distances suggesting that those people moving out of Toronto likely settled in surrounding jurisdictions. Yet the economic downturn in Ontario during these years may have compelled people to move further.

In turn, rural areas have upon occasion experienced relatively more growth than have large centers. Throughout the 1970s, the growth of many North American cities began to slow and there was an increased proportion of the population living in non-metropolitan areas (Berry, 1976). Much of the growth of suburbs and towns outside core areas is attributed to families looking for more room for their children (Foot, 1996). Apparently, the baby boomers were marrying and moving back out of urban centers. Berry (1976) described the outflow from metropolis into hinterland as population deconcentration. Dispersion was evident when looking at reduced population gradients and internal population redistribution in rural areas (Goffette-Nigott & Schmitt, 1999, pp. 1239-1241). Density increases rapidly towards the center of core areas. During deconcentration, density was found to increase less rapidly and to be spread out further from the core.

Champion (1989) used the decline in urban population as a measure of deconcentration. He listed seventeen reasons for counter-urbanization, many related to economics. Of particular importance, though, are advances in transportation and

technology, as they allow people to live further from areas of high concentration, and as they relate to changes in wealth production and economic restructuring. At the root of the change from centralization to counter urbanization may be the "increased ability to specialize without the need for spatial contiguity resulting in 'urban hierarchy' having less meaning" (Champion, 1989).

Other dispersion processes include attitudes regarding urbanity versus privacy and living in single family dwellings in countryside settings (Bunting, 1999). In describing the 'dispersed city form' of Kitchener/Waterloo, Ontario, Bunting points to the amalgamation of small centers and the lack of a core as important contributors. She suggests that this form is not uncommon, especially for smaller centers, while large agglomerations tend to maintain a strong central business district.

Although deconcentration may be considered a rather recent phenomenon, others have pointed to a history of fluctuating degrees of expansion and contraction of urban centers (Robinson, 1989). What is important to consider in terms of counter-urbanization is the difference between maintaining an urban lifestyle, or adopting a rural lifestyle. The former refers to an 'extension of the metropolis' and the maintenance of integration, even if it is not so vertical, while the latter refers to a less social and more environmental orientation.

While the influence of the central place may fluctuate, the fact remains that there are places with high, and growing, population concentrations and high degrees of social and economic integration. The rise of the service sector has provided some centers with a new primary function. Indeed, the decline in the use of the central business district in some larger manufacturing centers was replaced with the influx of more white collar

workers (Ley, 1993). With globalization, the 'traditional' industrial core/periphery relationship may be undergoing some fundamental changes. In some cities, opportunities for education and training as well as the availability of health services and improved living standards attract people and firms. On the other hand, access to education and health services via improved technologies reduces the need to move, and improved living standards may not always be available in cores. The 'city effect' which attracts people may result in 'overburdened cities' (Cicerchia, 1999). Thus, Cicerchia suggests, mobility between the core and the periphery attempts to seek an acceptable equilibrium.

2.1.3 'City Effect' - Attraction Indicators

Attempts to measure the attractiveness of cities have led many economists and sociologists to seek appropriate indicators. Economists point to superior goods and services and maintain that the awareness of market conditions influences decision making (Goffette-Nigott & Schmitt, 1999). Sociologists point out the inadequacies of this approach, and by using subjective measures have found that attractiveness includes clean neighborhoods, low crime rates, and sufficient public spaces (Michalos, 1997). Cities are attractive, it is suggested, until they become overburdened. Then, other or opposing economic and social factors 'kick in' to help alleviate the problems associated with crowding (Cicerchia, 1999). Cicerchia suggests that 'city effect' indicators include GDP, tertiary sector employment, retail sales, conferences and exhibitions, art displays, etc. Overburden indicators include pollution, waste, rent, commuting time, mental health, crime, etc. This approach searches for what constitutes optimum centrality, where social indicators play a key role and therefore ignore what might constitute optimal dispersion, where environment indicators play a key role. Economists suggest that as demand for

urban living rises, so do land prices, and some people sell, particularly when there is a reduced requirement to live in close proximity to work, choosing to live in less dense areas with lower prices (Goffette-Nigott & Schmitt, 1999).

Apparently, "medium and small sized cities often present higher social and environmental 'livability', but generally lack city-effect, and tend, consequently to lose people" (Cicerchia, 1999). Social factors include safety, variations in the organization of the delivery of services, while environmental conditions focus on indicators such as pollution. But in both orientations, social and economic, the attraction of rural settings is given less importance. At best, it is considered as an option to the side effects of growth in population concentration.

2.1.4 Rural Effect - Attraction Indicators

Very few indicators are suggested for what might constitute 'rural effect'. Economists highlight the lower land values and the potential for development (Mueser, 1997). Sociologists bring attention to conditions such as relative peace, quiet, and safety and go as far as to mention lack of snow (Michalos, 1996). With the increased interest in health as life style, it appears as though the environment in which one lives (this may vary considerably in scale between individuals) is being given more weight in the measurement of attractiveness and quality of life. Although 'rural effect' is not specifically targeted in the literature, geographers have provided a greater scope in the use of environmental indicators of quality of life. For the mobile elderly, climate, landscape, and recreation are said to be important factors (Moore, & Rosenberg, 1997).

For quality of life indicators in rural settings, a greater emphasis can be placed on environmental conditions, and less on social conditions. A list of elements is proposed in

table 1 below which might be used to move the inquiry from generalities to specifics. Of course, in order to make a balanced comparison with Cicerchia's indicators, a list of rural 'overload' indicators should be included. This would focus on extremes in weather and natural hazards, and also the effects of extreme isolation.

Table 1. Elements which might make up Rural Effect

<i>Setting</i>	Climate, landscape, access or view of water, flora & fauna, esthetics, fresh air
<i>Activities</i>	Nature & natural history walks, hikes, swimming, bird watching, gardening
<i>Built environment</i>	Access to amenities, accommodations versus severe, hazardous conditions
<i>Social interactions</i>	Independence, individual fulfillment, flexible yet cooperative.

2.1.5 Continuum / Gradients

Dichotomies highlight the differences between urban and rural areas. This ignores the suggestion that there is a continuum between the two dichotomies. The complexity of the definition, moving from dichotomy to continuum and back, is addressed by Cloke and Griffiths using a cyclical model of the rural-urban relationship in *Rural Resource Management*, 1985. Using a dichotomous classification does not allow for the recognition of variations within what is considered rural or urban. In considering gradations, variations in spheres of influence of both extremes can be explored. A continuum implies that urbanity reaches into rural settings, and that vice versa, rural influences reach into the core; with a blend or mix of both in between the extremes. If urban characteristics are most evident in the core, are there gradations outwards toward the periphery? Rural communities near large urban centres do not have to contend with

aspects of isolation experienced by people in northern rural communities. Nor does the latter contend with many of the difficulties experienced by those close to core areas.

Spheres of influence in either direction are therefore important to consider. Von Thunen, Weber, Christaller, and Losch have put forward 'location' and 'central place' theories utilizing homogeneous planes. Human activity was thought to be influenced by distance to core areas. Christaller suggested that higher order goods would be made in the largest of cores with less refinement occurring towards smaller centers. Local needs would be satisfied in the local market, but people and goods would travel farther for more durable and refined products and services. Therefore, the sphere of influence of large centres would reach farther than, and over, lower ordered centres. Sociologists carried this framework further to suggest that concentric rings (spheres of influence) could be used to match place to class (Park, Burgess, & McKenzie, 1925). More recent studies in rent gradients have found that prices drop with distance from the core but rise slightly outside of high activity areas only to drop off again (Goffette-Nigott & Schmitt, 1999). Spheres emanating from core areas can be augmented with the inclusion of sectors or wedges (Hoyt, 1939). These recognize the importance of major arteries which feed the city. Activities in areas between major arteries differ from those occurring along transportation routes. As well, the influence of urban areas may extend further outward along such channels. The use of idealized planes has its drawbacks. First, there is no such thing (though Brandon, Manitoba comes close), and second, humans are not recognized as acting outside of economic rationality. Yet, idealized forms can provide a framework with which to consider variations.

Recently in Canada, the recognition of gradations between urban and rural areas has resulted in the development of 'metropolitan influence zones' or MIZ (Statistics Canada, 2000). This approach uses place of work to indicate the percentage of people who commute to a core regularly and is exemplified by distance decay. A study of comparisons between percentage of people commuting to work with other indicators of social and economic integration show that 'place of work' is a conservative estimate of spheres of influence (Munroe, 2000). The purchase of both minor and major goods extends much further than would be indicated by place of work. Indeed, it appears that two recent phenomena may contribute to this extension. One is the proliferation of 'big box' stores on the urban fringe and the continued sub-urbanization of major regional shopping centres; and the second is the movement of retirees into areas outside of high commuter flows.

Perhaps large numbers of retiring baby boomers will move out of core areas in a dispersed pattern, seeking more 'elbow room'. Later, with aging bringing on increased disabilities, the old elderly (those over 75 years of age) may move together in a clustered pattern in order to benefit from central services and facilities. Of course, not all of the young retirees will move to single family dwellings on large tracts of land. Instead, many may seek retirement communities outside of high commuting zones, while others may move into core areas. From studies done in the United States, Marans et al. (1984) see many types of retirement communities to which retirees will be increasingly likely to move. The five types of retirement communities described can be ranked in order of distance to core areas with none being out of reach of services. Interestingly, the greatest clustering occurs closest to and furthest from the core; for example, retirement homes in

the former case and park fringe communities such as Wellington Ontario in the latter case.

2.1.6 Life Style

As mentioned previously, observed behavior may differ from subjective perceptions. Systematic data sources such as the census can provide some insight into behavior, but subjective input is important as well. Indeed, urbanites may live in urban settings but adopt rural ideals; ranging for example, from higher levels of support of environmental regulation to perhaps the adoption of herbal remedies. Yet, rural dwellers may live in the country and adopt urban ideals; for example aspirations may lean towards the latest model vehicle and/or the 500 channel universe. Curiously, in this manner what is urban may be defined by rural residents' ideals and rural may be defined by urban residents' ideals. Some have suggested that rural settings provide a relaxed atmosphere and freedom from routine. On the other hand, it can be a very demanding life style.

Nonetheless, the point here is that in measuring a healthy environment, both activities and perceptions should be considered and the exercise requires an awareness of both the dichotomy and the continuum. Bunting (1999) makes a point of these variations in a summary of focus group discussions regarding the ideal place of residence; although the sample group was small the discussions were thorough. She reports that for apartment dwellers, rural settings were preferred and that for single family dwellers, urban settings were preferred.

2.2 Health Care and Quality of Life

The discussion so far has been around the subject of urban and rural integration and interactions. This section continues the discussion with an emphasis on health care

and quality of life. The former refers to health in terms of treatment, while the latter refers to health as a "resource for daily activity" (Raphael, 1996, p. 67). While the health care system is designed to provide treatment, an increased emphasis is being placed on prevention rather than cure. Recently, this has led to the implementation of the Primary Care pilot project in Ontario (Ministry of Health and Long-Term Care, Ontario). The emphasis on prevention begins to highlight the importance of quality of life as a contributor to health and in turn does not neglect the role of health in quality of life. Here we can see more easily that the definition moves from the individual and/or group to the surrounding area or environment. An exploration of ideas of what constitutes quality of life follows an examination of health as treatment with a focus on primary care, innovations, and social support networks.

2.2.1 Health Care

2.2.1.1 Health Care in Rural Areas

The source of remedies and service delivery is often perceived as emanating from the core to the periphery. This bias ignores many of the contributions made in the opposite direction. Are there differences between rural and urban areas in the provision of treatment? What are some of the problems in improving primary care in rural areas? Will improvements in technologies improve health care delivery into rural areas? On the other hand, rural areas are considered by some to be 'an antidote to city life'.

It was not long ago that rural dwellers had longer life expectancies than their urban counterparts. Overcrowding, pollution, and disease made urban life dangerous. Rural residents on the other hand were said to have had clearer air to breathe, and cleaner

water to drink. But today, improvements in sanitation and access to the advancements in medicine have improved life expectancy for urban dwellers. Do rural people have less healthy lives because of reduced access to treatment? Studies point to the lack of access to specialized tools and techniques available in areas of high population concentrations (Fryer, 1999; Baldwin, 1999). "Rural and urban areas have significant differences in the availability of medical technology, medical practice structures and patient populations" (Baldwin, 1999). Rural areas close to cores may not share the stark contrasts in access that exist between southern and northern communities.

Efforts have been made to delineate areas in need of improved access to core cures, yet the indices vary between places and over time. For the provision of primary care services, delineation requires clear goals in assessing local health care needs (Taylor, 1998.). In Ontario, indices for defining the need for primary care facilities will follow the current reassessment of hospital networks in Under-Serviced Areas (UA). The Health Services Restructuring Commission (HSRC) "anticipates that the designation of these facility types will occur following the identification of the members of the [hospital] network, and the subsequent program consolidations and/or transfers among network members" (Health Services Restructuring Committee, *Annual Report*, 2000, p. 4). The hospital networks are established following county lines and include hospitals which can provide primary care and those which can provide secondary level services. Further refinement of primary care delivery into rural areas will follow an assessment of users' residences in relation to services provided. It has been suggested that if delivery were increased, there would be a greater use of the services (Fryer, 1999).

Cities are not without health service problems. Overburdened systems have resulted in people in ambulances being turned away from emergency services. In Toronto, an eighteen year old died from an asthma attack when the ambulance he was in was repeatedly turned away from hospitals (Decter, 2000). The level of service in smaller centers has been described in a Maclean's magazine article, as better organized. "Why? The answer is that in smaller centers it is easier to co-ordinate hospital, home care and other health services. In a smaller center, accountability and responsibility are more powerfully aligned. Failure to solve problems is transparent to the local newspaper and population. Accountability and responsibility are direct and obvious" (Decter, 2000).

2.2.1.2 Primary Care

Foot and Stoffman (1996) claim that Canada spends more on health care (9.2% of GDP) than some of the other industrial countries and is not getting better health care in return. Japan has a lower infant mortality rate and higher life expectancy yet spends only 6.5% of GDP. Can we deliver more health care service to the aging population without increasing costs? (Foot and Stoffman, 1996). The authors of *Boom, Bust and Echo* question whether this can be done by allocating scarce resources more wisely. Several areas are considered to be important for reducing cost: hospital efficiency, drug use, increased involvement of the private sector, and fee for service. Of course, hospital efficiency translates to shorter stays in hospitals and other care facilities and a downloading onto family members and social support networks. This topic will be taken up after a discussion of primary care of which fee for service is a component.

Politicians advocate the necessity for primary care as a way of reducing costs, and at the same time improving service. Policies implemented by the Ontario ministry of health and long-term care to meet these goals include increasing the supply of practitioners and distributing them throughout the province in order to ensure that people in all areas have adequate service (Ministry of Health, 2000). This includes the addition of nurses, physician assistants, and nurse midwives as health care providers as they offer the advantages of reduced cost (per provider) and a strong primary care orientation (which reduces costly secondary and tertiary treatment).

Efforts continue to be made to encourage health care practitioners to work in rural areas. Letting market forces work their redistribution magic in *laissez faire* administrations has not resulted in adequate dispersion (Barnett, 1993). Interestingly, as primary care involves more general practitioners able to meet needs in low density areas, doctors in training are increasingly more likely to specialize and require ready access to high population concentrations. Studies by Politzer (1999), Rabinowitz (1999), and Barnett (1993) support the role of government and policy makers in providing incentives. Incentives include extra money making it expensive to draw doctors into rural areas. Once practitioners are encouraged into rural areas, they still tend to congregate in towns and villages and continued efforts are required to ensure further dispersion (Connor, 1995). Costs are high to keep these people apart.

2.2.2.3 Innovations

Sharing information might be the most valuable and enduring quality underlying the move to a primary care orientation in health care services. "The challenge to medical

informatics is to connect dispersed providers, not just with videoconferencing, but also with other information-sharing methods" (Hassol, 1997). Examples include greater access to information for users as well as the sharing of information between specialists.

Many countries have begun to extend the use of primary care programs in order to better utilize improved technologies (McCarthy, 1995). Administrative structures have required some adjustments particularly with the expansion into rural areas.

"Telemedicine, the use of communications technology in the practice of medicine, may change the way rural health care is provided by improving access to medical information, diagnostic tools, and consultations" (Kienzle, 1995).

For people retiring into non-metropolitan areas, improved technologies offer access to specialists elsewhere. For people living in areas outside major urban centers who share similar health difficulties, interactive video conferencing has proven to be beneficial. "Responses were favorable and virtually all patients viewed this as a means of accessing better health care" (Hubble, 1993). Health practitioners in rural and remote areas can convey and receive information via improved communications; however, improved telecommunications does not address manual, 'hands on' needs.

2.2.1.4 Information in the Home

In the United States, pilot projects have been initiated to test the functionality and usefulness of telemedicine. One such program has been running in rural Kansas since the mid-nineties; "the Interactive Home Health Care Program is a demonstration project evaluating the use of in-home telemedicine to provide health care for elderly and disabled

people" (Lindberg, 1997). Other similar projects are described by Phillips (1996); McCarthy (1995); Martinez (1995).

New technologies allow information to be passed from the patient's location to other places for assessment. Sensors can monitor people 24 hours a day for basic bodily functions. If parameters exceed acceptable tolerances, patients may be warned and/or intervention may take place. Rings sensors are available which can be worn around the clock for continual monitoring. Toilets have been designed and implemented which monitor daily by-products and send a steady stream of information to doctor's offices where the data are analyzed and steps are taken to improve health if necessary. It is felt that health care can be improved greatly if remote monitoring were widely available.

"The design and implementation of a multidisciplinary research project and associated field trials to test the hypothesis that functional health status amongst the elderly can be accurately determined remotely by continuously monitoring relatively simple parameters that measure the interaction between participants and their environment" (Celler, 1995).

Although there may be a great potential for improved health via improved telemedicine, administrations are not always so readily able to accommodate change. Thus, there have been calls for fundamental revisions in health care. "Home telecare, in which the health status of patients at home is monitored remotely, has the potential to improve care and reduce costs. Its widespread implementation would require fundamental changes in the healthcare system" (Celler, 1999).

2.2.1.5 Barriers To Use

Of fundamental importance is the implementation of information management processing which can be used by general practitioners as well as specialists and

alternative care providers. Lovell (1999) purports that "appropriate application of information technology in primary health care will extend traditional diagnosis and patient management beyond the doctor's clinic into the everyday living environment". This involves implementation of new technologies and the "design of innovative home monitoring techniques and a telemedicine based communications infrastructure" (Pelletierfleury, 1997).

Though hardware and software barriers are dropping quickly and administrations attempt to become more flexible, other barriers prove to be less fluid. Paul (1999) points out that the "mismatch between the sophistication of the technology and end-user requirements for clinical activities and patient confidentiality and privacy issues were supported as barriers". Yet for many, these innovations do not amount to much, as day-to-day chores required in the care of the elderly are still very much manual and need to be addressed locally.

2.2.1.6 Alternative Health Care

One last 'treatment' related topic which should be discussed, if only briefly, before moving on to social support networks, is the increasing use of alternative care providers. Perhaps, not surprisingly, the bulk of the literature on health treatment points to technological fixes. While these are important, 'holistic' approaches deserve attention as well. Alternatives include naturopathy, homeopathy and acupuncture among other approaches to health care. These may be considered alternatives, but for many people these are accepted practices. For example, acupuncture is now recognized by the province of British Columbia and covered by medical insurance. Increasingly, people have been turning to alternatives as a way of maintaining and improving health. In the

future, tax relief for use of alternative health care services may help alleviate pressure on the health care system.

Curiously, the use of alternative health care services seems to be an urban phenomenon. In fact, at a conference on 'Rural Health' in Ottawa (2000) herbalists and naturopaths were seen to emanate from cores, with a limited sphere of influence, and not a feature of rural areas. Therefore, as distance from the core increases, so does the percentage of people relying on 'western' medicine. But for many people, particularly younger urbanites, western medicine is no longer as trustworthy or acceptable as it was in the past. Perhaps the difficulty is not western medicine's need for empirical verification but rather its awkward union between a centralist hierarchical structure combined with an emphasis on the specific rather than the whole.

2.2.1.7 Social Support Networks

Another measure aimed at reducing health care costs is to recognize the potential of social support networks. This has a direct impact on hospital efficiency, which can be improved by reducing stays. Consequently, short-term and in some cases long-term care provision is being moved out of hospitals into the home. This results in an interesting tension. Strong social support networks may improve hospital efficiency but they may also be related to lower levels of acceptance of innovations or change. People who belong to strong or 'high density' social support networks have been shown in some studies to be reluctant to accept professional services and advice (Fisher 1977); whereas, people in weaker, less dense networks which can be larger but more fragmented and heterogeneous, seem to be more willing to accept other sources of help (Wellman 1997).

It has been suggested that urbanism and middle class status reduce the density of social support networks (Fisher 1977).

In 1995, G. Clare Wenger published a study titled 'A Comparison of Urban and Rural Support Networks' in which a typology of networks was developed based on three factors:

- 1) the availability of local close kin**
- 2) the level of involvement of family, friends, and neighbors**
- 3) the level of interaction with the community and voluntary groups**

Wenger found that rural areas may not provide high density networks. In fact, elderly people in rural areas showed weaker networks, and a higher degree of acceptance of public and private services, than did the urban dwellers in the study. It turned out that rural areas which attracted elderly urban retirees were characterized by fragmented social networks, being less stable than urban areas in which people do not move. Therefore, a distinction is made between locals and newcomers. Golant (1987) suggested that it is important to "consider how the personal characteristics of a place's in-migrants (for example their lifestyles, health status , values, and personal resources) differ from those of its current elderly residents if one is going to speculate on the impact that a new population will have on a community's social and political fabric." Therefore, migration was found to be far more important than previously assumed. In closing, Wenger suggested that "in terms of the provision of care in the community, these indicators (migration and culture) can be seen to be important in planning the levels and appropriate mix of domiciliary services" (Wenger, 1995, p. 78).

2.2 2 *Quality of Life*

An economics approach to quality of life may emphasize income, finances and use standard of living as indicators. While these are undoubtedly important aspects of health, social researchers are quick to point to inadequacies. Michalos points to the results of the tests of Tiebout's hypothesis that local public amenities differ in kind and result in more and less attractive places (Michalos, 1997, p. 126). The results of social surveys on the subject suggest economic conclusions are misleading. Cebula examined the movement of people to and from different areas as outlined by Tiebout and found that people moved less for tax reasons and more for jobs, friends, family and quality of life (Michalos, 1997). What is of particular interest here is the importance placed on migration as a way of analyzing quality of life. Mobility may be influenced by features which make up quality of life, but features which make up quality of life may be influenced by mobility.

2.2 2.1 Definitions of Quality of Life

The definition of quality of life is complex (Naess, 1987). Indeed, it is thought by some to be a social construct and therefore very subjective and given to ever changing variation in meaning and value (Brown, 1994). This makes the choice of indicators difficult and continually subject to review for relevancy. Social indicators researchers have suggested the problem of definition lay with the emphasis by evaluators on operational rather than conceptual definitions (Raphael, Renwick, Brown, & Rootman, 1996). The World Health Organization (WHO) (1980) suggests that physical well being is no more important to health than mental and social well-being. Health is defined as "a state of complete physical, mental and social well being and not merely the absence of

disease" (WHO yearbook, 1980). A health care system might more accurately be described as a sick care system.

A sick care system emphasizes the role of health treatment as contributing to quality of life but social scientists point out that quality of life contributes to health, and therefore is "a resource in daily living" (Bowling, 1991). In fact, it has been found that consideration of quality of life can improve medical treatment (Splitter, 1990). A health, rather than disease, emphasis points to the use of indices of positive physical, mental and social well being. Bowling suggests that this approach is more likely to have originated in the social sciences (Bowling, 1991). Bowling expands the health focus to include positive 'behavior functioning' as well as ability.

2.2 2.2 Life style

Consequently, the emphasis moves from health as a measure of health care services results or outcomes of treatment, to that of inputs which contribute to quality of life as life style. An individual's life style can influence their health. There is no shortage of activities which can reduce life spans. Smoking, alcohol and drug abuse can be life threatening. On the other hand, a proactive, health-conscious life style is thought to reduce the need for treatment. This orientation includes being informed, as well as participating in activities which encourage mental, physical, and spiritual health. Being health conscious and informed can enable people to catch problems early, avoiding life threatening situations which might arise from neglect. For example, people who have regular physical checkups without having an overt health problem reduce the need for expensive secondary or tertiary care. Participating in activities which encourage health might include regular exercise. For the elderly, these could include walking, bird

watching, and gardening. These types of activities may be better facilitated in rural areas. Maher and Stimson (1994) point to the recreational potential of physical environments as an important ingredient in quality of life.

2.2 2.3 Environment

The WHO (1980) also stressed the environmental context in which health issues may worsen or, on the other hand, improve. Medical attention may be available but if the environmental conditions are inadequate, results may be poor. Yet a 'good' environment alone may not be enough and therefore the combination of adequate care and good environment may have a multiplicative affect on health. Environmental contexts for improved health and perception are thus recognized. Perhaps not surprisingly, indicators of quality of life tend to focus on social environments rather than 'physical' environments.

Environment indicators which relate to quality of life tend to reflect social (human to human) conditions (Ashton, 1992; Davies & Kelly, 1993). These indicators are meant to address social program objectives and therefore physical environment indicators are secondary and tend to be considered for their purifying qualities. Nonetheless, a distinction between social and physical environments is made at varying scales. When the physical environment is discussed it is usually at the macro level within which human activity takes place. Micro level indicators more accurately estimate density, social networks, and the availability of health services (Schwirian, 1995; Currie & Thaker, 1986). At the neighborhood and household level, subjective perceptions can be included to better understand quality of life (Michalos, 1996).

2.2 2.4 Perceptions

Again, perceptions play a role in choices of places to live and what makes up quality of life. Baby boomers may be inclined to move outside of high density areas. Too great a dispersion though may impede the delivery of health care services. Doctors are said to be reluctant to move away from cities. Rural areas may be able to attract doctors by providing an improved quality of life.

A study of doctor's preference of places to live (in terms of rural or urban settings) shows that quality of life is an important element (Pagliccia, 1993). For doctors, the quality of education, the quality of life available for their children, the quality of housing, along with access to specialist expertise are the most important factors. When these are met, doctors consider towns of less than 10,000 to be urban.

In summary, both life style and the physical environment are important features in health and quality of life. Natural features and access to services are both thought to be attractive. Migration itself is said to influence social support networks as well as life style and the environment, as people seek to maintain and improve health and quality of life.

2.3 Age cohort

Before looking at migration as a way of analyzing issues of quality of life, it is helpful to narrow the inquiry by considering age and life cycle differences. Several authors have suggested that the elderly are not only growing in numbers but are also increasingly mobile (Bohland & Rowles, 1987; Golant, 1988; Golledge, 1997). Others claim that the vast majority do not move at all (Moore, & Rosenberg, 1997). Firstly then,

who are the 'Baby Boomers'? Are they members of an anomaly represented by a large bulge in the population pyramid? Are they unusual because they were preceded and followed by lower total fertility rates (TFR)?

2.3.1 End of an era

A closer look at the population pyramid (figure 1) suggests that the 'boomers' are better characterized as the end of an era rather than a product of unusually high fertility rates. The pyramid has two distinct components, one which precedes and includes the baby boomers, and one which follows. The shape of the top portion of the pyramid, showing the numbers of persons over 30 years of age in 1996, is much more flared than is the lower portion which shows the numbers of younger people. The upper flared portion of the pyramid is similar to that found amongst the fast growing countries in the world today. This rapid growth was an important feature of European expansion for many generations. In fact, the exponential growth in North America over the last century and a half, particularly of populations of European origin, seems to have stopped with the end of the baby boomers. Here after, the total fertility rate drops radically. This era (the last one hundred years) can be considered a transition period between rampant population growth and replacement reproduction. Perhaps, the alarm over 'over population' sounded in the late sixties did influence reproduction. At the time, rapid population growth in North America led people to consider the possible resulting dangers (Nixon, 1970). There were concerns that people would reproduce beyond the means of the environment. There are many reasons suggested for the drop in TFR including improved technologies and changing socio-economic conditions. Yet acceptance or resistance of these technologies is also important to consider. The realization of real world limits seems to

Figure 1. Population Pyramid.

have precipitated an increase in environmental consciousness as well as self determination. This point is raised here because exogenous, macro influences may play a role in variations in activities and attitudes between different generations. "Patterns observed among the present elderly population and the solutions recommended to address their needs ... may be inaccurate and unsuitable a decade from now because of different composition and attitudes and behaviors of future cohorts (generations) of (the) elderly" (Golant, 1986).

Curiously, TFRs of three to four children were reported to be common amongst native North Americans during early contact with Europeans. The low numbers compared to Europeans were attributed to the aboriginal male's low drive to reproduce and were used to further justified notions of superiority (Hiedenriech, 1972).

2.3.2 Life course

In 1955, Rossi suggested that life cycle was an important variable in estimating movement. This approach highlights variations in activities by age. Children move out of family homes when they are a certain age, court (this used to occur before moving out) and start families of their own. Subsequently, the adults no longer need large homes and move to smaller, easier to maintain, accommodations. The elderly can be roughly divided into two groups again by age: the 'young elderly' being 65 - 74 years of age, and the 'old elderly' aged 75 and over; the former being healthy and active on average while the latter are said to be more disabled. Nominalization of activity and in some cases of attitudes by age has its limitations for there is a great deal of variability in life choices (Grundy, 1992). Life cycle does not take into consideration variations in life style, culture, income, status etc. The term 'life course' allows for greater variability with less

emphasis on 'traditional' family transitions (Warnes, 1992). As well, there is a greater degree of diversity for the elderly for "as life expectancy increases, researchers will notice wider gaps in the lifestyles of people over age 60" (Loomis et al., pp. 33 - 34).

When looking at the overall population and spatial distribution patterns of migration, there are differences between people by age cohort. Youth tend to move to core areas with training and job opportunities while the elderly tend to move to rural areas for recreation, quality of life, health services, and housing (Michalos, 1996). After retirement, the post employed retirees can live where they like without having to consider proximity to work, if they can afford to move. In fact two studies, McHugh (1984) and Oldakowski and Roseman (1986) point to employment as having been a 'locational binding agent' for elderly migrants. Perhaps people in the work force who are no longer tied to location, depending on the type of work, can be employed without having to move to core areas.

2.3.3 Mobility for the elderly

People between 25 - 29 years of age move in greatest numbers while only 20 percent of those over 60 (which is a much longer time period, at least for some), move (Kremarik, 1999). Yet, a look at mobility statistics for Canada from 1991 show that this figure is simply an average of percentages from each of the five year groupings for those over 60 years of age (see Table 2). If it is true that the elderly are less likely to move, these values can be viewed in another way. Each of the percentages could be added to give a total of one hundred and sixteen percent movers. Obviously, this can not be the case and therefore some do move a second time. The elderly may move shortly after retirement seeking better locations for recreation and once again in later years for

support. (Hunt et al., 1983; Moore & Rosenberg, 1997). If all of those who move in the early years of retirement, move once again in the later stages, then the percentage of elderly movers is still much higher than the conservative estimate of 20 percent would suggest. Indeed, it may be that most elderly move at least once.

Table 2. 1991 Mobility for the Elderly (Che-Alford,1998)

Age group	% Stayers	%Movers
60 - 64	77.8	22.2
65 - 69	79.4	20.6
70 - 74	81.8	18.2
75 - 79	81.6	18.4
80 - 84	81.6	18.4
85+	81.5	18.5
Total		116.3

2.3.4 Life cycle activities

The types of activities people are involved in may differ between age groups. The elderly may engage in recreational activities such as gardening, walking and bird watching while the youth may prefer to congregate and shake to their 'rock and roll'. The elderly may also modify landscapes through their activities, in order to improve well-being (Marans, et al., 1984; Golant, et al., 1988). Although normative classifications such as life cycle have been called too restrictive, thus taking away from individual self expression, determinism increases as people approach death by aging. Other issues pertaining to mobility and the elderly are taken up in the following section.

2.4 Migration / Mobility

In this section, mobility is defined and then discussed in terms of movement between core and periphery or across population density gradients. This lays the ground

work with which to examine the mobility of the elderly and the importance of both net and gross calculations.

2.4.1 Space and Time

So far, the discussion has focused on health related behaviors for the elderly using a urban rural framework. Without bringing in movement, this is a cross-section and can only provide a snapshot which may reveal forms in relation to place. A snapshot is a 'still picture' which removes time. A still picture creates an object oriented inquiry which leaves us to speculate about interactions while measuring forms. Interactions involve movement across space through time. Interaction refers to the verb rather than the noun and is made up of dynamics such as function, techniques, dialogue, communications, and the dance that is life. To include interaction, time is necessary.

"To understand human spatial behavior, rather than just monitor it, we must treat time explicitly as the path which orders events as a sequence, which separates cause from effect, which synchronizes and integrates...(in fact) the lack of an explicit treatment of time in behavioral studies, apart from the odd desultory venture into the field of predictive analysis, has been truly remarkable." (Cullen 1978)

Bringing time and space together, once pulled apart by Kant, has been an exercise examined by time geographers. Hagerstrand was able to develop several criteria, one of which highlighted the difference between time and space. "Space has a limited capacity to accommodate events because no two physical objects can occupy a particular place" (Hagerstrand, 1972). Spatial studies, therefore, tend to focus on the description of objects. Interaction is discussed as possible relationships in terms of variations in distance in space at a particular time. Of course a place in space which is occupied by an object (within three dimensions - having volume) may house more than one type of object; for

example a human may house a variety of yeasts and bacteria. But, "any physical object has a limit to its outer size and so limits the number of objects that can occupy a particular space" (Hagerstrand, 1972). Indeed, a cross-section approach emphasizes difference for things that are the same, while time allows similar things to occupy the same space but, of course, at different times. "Thus every space has a packing capacity, which will be defined by the types of objects to be packed into its area or volume" (Hagerstrand, 1972). Therefore, a spatial study without the addition of time tends to be object oriented. When combined with an empirical material orientation, the less tangible may be relegated far too easily to that with which we need not be concerned. Democritus articulated this worldview 2500 years ago by stating 'all there is, is the atom and the void.'

A person's path over space and through time can be thought of as '*dynamic maps*' made up of '*path space-time bundles*' (Pred, 1981). These vary by distance and duration. Pred uses these to explore projects and goal oriented behavior where individuals take part in activities with others, referred to as 'activity bundles'. Scale can move from individuals to groups, to a population system of individuals in a bounded region of space and time. A population may share characteristics, such as age but must be distinguished from activity systems. Yet, with the addition of time, there is an interplay between population and activity systems (Hagerstrand, 1972). Efforts have been made to advance this area (era?) of study using Geographic Information Systems (GIS), but the computational demands made by blending time and space are as yet out of reach. The difficulty may not lay so much in bridging time and space but rather may result from difficulties in moving across scale. The potential of fractal geometry appears to be promising as it may help with "studies into the ways things meld together and the way they branch apart" (Scholz,

1982). Hawley (1968) views 'migration as a dynamic process of change through which an equilibrium is maintained'. This equilibrium attractor, mathematician Ralph Abraham suggests, may not mean stasis, for there can be movement in the balance (Lovelock, 1979). Indeed, movement is needed not only for physical existence but also as a means of gathering information.

2.4.2 Density gradients

Core periphery movement need not be restricted to residential mobility by life cycle. Indeed, many people move to and away from core areas on a daily basis. Living outside of, but working in, the core sets up a movement across density gradients usually within a sector emanating from the core. 'People tend to have a common directional bias, usually in the form of a sector or wedge shape.' People move towards and away from the core but seldom through or around it (Adams, 1969; Zannaras, 1973). But, 'this bias may not hold for people living near the center' (Golledge, 1997). For rural dwellers, daily mobility tends to be away from social interactions towards the natural environment.

Daily moves tend to be shorter while longer moves are less frequent. Some stays are short or seasonal while others are long term. Shorter moves are thought to be social in nature while longer moves are made for economic reasons (Long & DeAre, 1980). A distance distinction between short and long moves is often made at fifty kilometers as this is usually the outer limit of journey to work, although this has changed considerably over time.

During the late 1800s and early 1900s, urban areas were thought to be particularly attractive; exerting a considerable pull on people in surrounding areas (excluding moves

due to land clearances). Ravenstein's third 'law' of migration states that flows are strongest from rural to urban centers with a smaller counter stream (Lee, 1969). Cities draw on surrounding areas for labor (including land clearances). This migration field grows with the size of the city. The greater the distance, the less the drawing power. As well, cities may not attract 'in' migrants if there are intervening opportunities.

Hagerstrand (1957) used in and out migration data to test migration in relation to population and distance and the role of intervening opportunities. After using different methods of aggregation, he found that intervening opportunities did not play a role in migration fields of large centers.

The patterns of moves between core and periphery differ for various age cohorts. The age group that moves into an area is not usually the same as the age group that moves out of an area (Mueser, 1997). For the total population, though, the size of the migration stream is more highly correlated with the counter-stream than with any economic indicators. The stream and counter-stream carrying the different age groups in different directions tends to be across, rather than along, density gradients (Goffette-Nigott & Schmitt, 1999).

Consideration of appropriate levels of aggregation raises the issue of scale of analysis and moves the study from an overview of population moves (macro level) to the local moves of individuals (micro level). Thus, the study moves from generalizations to specifics; from nominalizations to increased variability; with the opportunity to move from objective to subjective inputs. Macro moves can tell us whether the population being considered disperses or clusters or if their actions lay somewhere between these extremes and can then be considered random. A macro data set can be used to answer

'where' while a local study can be used to attempt to understand 'why'. Therefore, the study moves from patterns in the former case to processes in the latter case (Jones, 1990). The actual, factual behavior can be examined in relation to ideas and perspectives. Hagerstrand (1955) reminds us that 'where' is descriptive while 'why' is subjective and requires a cautious approach.

2.4.3 Mobility for the Elderly

The propensity to move declines rapidly after 25 years of age, increasing slightly after 65 (Rowland, 1982). Yet, several researchers have pointed to the increased residential mobility of the elderly both in total numbers and in the variety of places. Golledge summarizes research done by Golant et al.(1988) and Hugo et al.(1984) as having found “an increasing dispersal to an increasing diversity of locations outside traditional retirement regions, and a growth of elderly population concentrations” (Golledge, 1997, p. 551). Increasingly, improved technologies and transportation have allowed elderly people to move out of densely populated areas into rural settings with continued access to amenities. Drawing on work done by Bohland & Rowles (1987), Golledge reports that the “growth of the elderly population was becoming more locationally widespread, that older people are moving to more dispersed locations, and that they are no longer restricted to traditional retirement and/or amenity locations” (Golledge, 1997, p. 552).

The elderly in rural areas also move. They may move into large centers, but more often they move into small centers (Moore & Rosenberg, 1997). Their absolute numbers may be small in comparison with the elderly in large centers but their relative impact is

greater. As well, rural residents often cannot afford to move to larger centers as the value of homes tend to be lower in peripheral areas (Golant, 1992; Moore & Clark, 1987). Of course, not every elderly person moves. Some may not be able to move, while others may be happy where they are.

For the mobile elderly, pull factors are seen to be more influential than push factors (Shaw, 1985). Increased density, pollution, noise and other difficulties arising from overburdening, may be compelling (Cicerchia, 1997). Subsequently, rural amenities such as recreation are sought by the elderly (Loomis et al., 1989). Yet, a move out of town may result in a move back later for health services (Newbold, 1993). Often these later moves do not result in personal satisfaction; friends and acquaintances are often left behind (McGuinness, 1996).

It is thought that elderly movers are financially secure and better educated than those less mobile (Moore, 1979). The young elderly tend to move as couples and be in good health and are interested in recreational activities (Fournier et al., 1988; Moore and Rosenberg, 1997). Another important factor in migration is information. Familiarity with other places increases the likelihood of moves to those places. On average, the distance of moves is lower for the elderly (Rogers, 1988). Familiarity is reduced with increased distance and subsequently moves tend to be shorter (Jones, 1976). Hagerstrand (1967) measured private information fields, using telephone calls, and found that these matched migration patterns. Information from family and friends was important in this regard. Today, this is thought to be less important (Michalos, 1996). More important are the travels made between home and area of recreation. Many Canadians spend their vacations, or have a second home, in rural areas. National and provincial parks are strong

attractors. Acquaintance with these places may result in residential moves upon retirement. Retirement locations on the edge of parks, or 'park fringe communities', have sprung up across the country. Subsequently, the in-migration of elderly people have an impact on the environment and the local economy.

There are a growing number of examples of population segregation where the elderly move into planned, walled communities (Gober, 1985). These communities provide many specialized services aimed at addressing the needs of the elderly. While segregated, these communities do have an impact on surrounding areas both in terms of environmental adjustments as well as demands on resources (Golant et al., 1988). The allocation of health care dollars may be a source of tension as the elderly needs differ from those of young families.

Of course not all elderly move to a different residence. Indeed, some areas are more stable than others. Stable areas with high levels of immobility are 'associated with low income, poor health, and perceptions that more suitable housing is not available' (Golledge, 1997). This does not mean that the elderly in stable areas do not move, but just that if they do, it is not away from previous ties. The majority of moves tend to have only partial displacement. "Total displacements are linked strongly to occupational mobility and by definition they involve substitution of old social contacts for new ones" (Golledge, 1997, p. 430). For the elderly moving out of town, contacts are likely kept with previous relations though fragmented and weakened (Wenger, 1995). Migration has been found to be an important factor influencing social support networks. The middle class are considered to be more mobile, but those who stay may live in transient

neighborhoods. Subsequently, levels of acceptance of alternative health care services may vary accordingly.

2.4.4 Measurements - Net and Gross

Knowing where people like to move can contribute to a better understanding of what constitutes quality of life (Kremarik, 1999). To this end, mobility can be used to examine the comparative attractiveness of an area over a particular time period. Net migration, the change in population due to factors other than births and deaths, or 'in' minus 'out' migration, can be used to find attractive and unattractive places. Bunting (1999) underscores the importance of space, proximity, and place when examining where and why people move. Privacy and a sense of rural 'nature like' settings were found to be contributors to dispersion. On the other hand, access to services and amenities can be contributors to clustering. Perhaps, people who move for an improved quality of life also are interested in activities which promote health.

Variations in gross mobility are also of interest. Gross rates, 'in' plus 'out', may tell us something about the nature of social support networks and interactions. People in stable areas (low gross mobility values) may have stronger ties with others and with the surrounding environment (including livelihood) than do people in high turnover, transient areas. Mobility was found to be an important contributor to the fragmentation of social support networks (Wenger, 1995). This fragmentation offered more avenues for different opportunities to reach individuals. Variations in the strength of networks are thought to influence levels of acceptance of change (Fisher, 1977). Perhaps variations in the strength of networks influence levels of acceptance of alternative forms of health care.

The vast majority of studies of mobility and quality of life focus on net migration. There are a disappointingly few references to the potential use of gross migration rates.

Innovations which may improve health services in rural settings may be more acceptable for former urban in-migrants than for long term residents in stable communities. Where there is a high in-migration and turnover of the elderly, social support networks will likely be weaker, resulting in a flexible detachment and a higher level of acceptance of alternatives (Wenger, 1995). Wenger found that the rural residents in her study did not have as strong a social support network as that of urbanites. The mobility rates and socio-economic differences in each setting proved to be important factors in this regard. The mobile, middle and upper class rural residents tended to have low density, fragmented and heterogeneous networks while the lower class urban residents belonged to high density, emotionally supportive networks which tended "to avoid using needed professional services or advice" (Wenger, 1995, p. 62). Privacy issues may be more important to urbanites and former urbanites. As well, back-to-the-country sentiments of the mobile urbanite may lower interest in technological solutions and therefore forestall the seeking of care via these methods.

2.5 Structure and Behavior

A discussion of health related activities in association with an urban rural framework requires a consideration of behavior and structure (Bogue, 1969; Kendig, 1984; Michelos, 1996). The degree to which these interface is difficult to determine. Some suggest that there is a separation between humans and the environment; where humans are free to think and act independently of the surroundings (French et al., 1974).

This worldview has been favored over determinism which implies stronger ties with the environment. Instead, the environment is external to human thoughts and feelings but it is where we act out and engage with our surroundings. Apparently, we give meaning to a meaningless world. It is through our beliefs and cultural indoctrination that we 'know' the world. Yet, this self-centered and anthropomorphic worldview is also deterministic. Perhaps, the world is not meaningless but rather the difficulty lies in our ability to interpret and see meaning clearly.

Amedeo (1993) suggests that two premises be made regarding human-environment relations. 1) activities and experience take place in environmental configurations, and 2) humans are capable of interpreting, praising, evaluating, and adapting to the environment. Consequently, people are thought to be separate from the environment but are informed through the senses. This information then is filtered through a belief system which ascribes meaning and results in varying degrees of emotional ties to 'environmental representations'.

Hart and Conn (1991) had a different point of view. Instead of human activity occurring in space, after the manipulation of information, they suggested that human activity occurred in place. Place is where thinking and feeling are relevant to the environment, thus bringing us closer to meaning and action. The focus moves from thought to action, where thought is adjusted by action rather than action being guided by reason. This orientation may be exemplified by adjustments in European philosophy during its age of expansionism. Thus the 'Age of Reason' might be relabeled the 'Age of Willfulness' (Schopenhaur, 1883).

The interface between memories and experience as transforming knowledge and therefore action was explored by Moore and Golledge in 1976. They called this an 'interactional-constructivist' model, placing a greater emphasis on previous experience and memories which transformed sensation into knowledge. Thus, the individual rather than the culture was given greater importance. Still, the experiences gleaned from the world around are said to be subjective and meaning is superimposed once again on a world which has no meaning.

What can mobility and quality of life tell us about human-environment relationships? Perhaps quality of life can be related to what might make up a 'healthy' relationship. Yet, this appreciation can still be cast in an anthropomorphic light. French et al. (1974) suggested that the environment provides resources to meet an individual's needs but an individual may not meet the demands required by the environment. This most certainly is true in some cases, but health may be exemplified as a symbiotic rather than parasitic relationship. Thus, a "reciprocal relation between environment and activities may exist" which Marans et al. refers to as a "person-environment congruence or fit" (Marans et al., 1984, p. 60). Environments can modify activities, impinging positively or negatively on an individual's well-being, and people can modify their surroundings, impinging positively or negatively on the well-being of the environment.

Mobility is an activity which may help highlight the interaction between behavior and structure. Behavioral geographers focus more on "why people move and less on the impacts of mobility on the structure of an area" (Golledge, 1997, p. 486). Human behavior which includes both thought and action can be viewed in relation to structures and methods of interaction. For Clark it was important to "relate mobility to the built

environment and to ask questions about the interaction of search, choice, and impacts both on the changing neighborhood, and on the population composition (Clark, 1993, p.300). For some, the ties get even stronger and more deterministic. Kendig sought "linkages between mobility and the life cycle" using Skinner's concepts of positive and negative reinforcement. For DeJong and Fawcett (1979) there were two features to consider:

- 1) Motivations for migration have roots or counterparts in environmental or structural factors that help explain aggregate mobility patterns.
- 2) The key to an integration is the identification of linkage processes through which macro stimuli are translated into relevant considerations for individual decision making.

Regardless of the variation in emphasis on causality, patterns in activity are thought to shed light on the relationship between environment and behavior (Clark, 1993). From these patterns we may be able to draw inferences. Spatial behavior can be viewed as a collection of individual activities, actions, reactions and interactions (King and Golledge 1978). Looking at human activity in relation to structure may provide "conceptual guidelines for relating behavior patterns to spatial organization" (Golledge 1997, p. 289).

2.6 Summary

A review of the literature suggests that mobility is important to consider when looking at health and quality of life issues. Indeed, a growing number of elderly are said to be more mobile than ever. Some places will be more attractive than others while some areas will be more stable than others. Rural destinations have been found to be popular but proximity to health care services is also important.

Those who do not move may live in transient communities. People in these communities may belong to weak social support networks and therefore they are more inclined to use public and private services. On the other hand, people in stable communities with strong social support networks have been found to be less inclined to accept change. Net mobility is often used as the dependent variable in relation to selected indicators in an attempt to explain why people move. Gross mobility is seldom mentioned.

Two questions regarding whether mobility is important to consider when looking at health and quality of life issues still remain. The structural question asks whether there is variability in mobility particularly in relation to urban rural settings. The behavioral question asks whether mobility is correlated to health related behavior.

CHAPTER THREE

METHODOLOGY

With the central question of *whether mobility is important when considering quality of life and health*, a methodology aimed towards investigating both structure and behavior in relation to residential movement by people in different age groups is developed. In this inquiry, the focus is on the elderly.

Structural considerations are herein primarily spatial and related to urban/rural differences. Therefore, the main question (from a structural perspective) is *whether mobility varies particularly between core and peripheral areas*. This question can be broken open to consider other possibilities such as, "Do retirees from the cities and retirees from the country move to the same places?" Since a structural examination only partially answers the central question, it is important also to look at health and quality of life related issues.

Behavioral considerations include an examination of a variety of issues which may be related to health and quality of life. Behavior refers to both thought and action as well as interactions. The main question here then is *whether mobility is correlated to variations in health related behavior*. Causality is not implied so tests for correlation are used since on one hand health and quality of life may influence mobility, and on the other hand, mobility may influence health and quality of life. It is important to consider both

structure and behavior in order to give a study of mobility and quality of life some breadth, as well as depth.

3.1 Net and Gross Mobility

How then can all of these elements be handled in a simple manner so that interpretation may be clearer? It must begin with a succinct measure of what makes up mobility. Net mobility can be calculated as the number of people having moved into an area minus the number of people who have moved out over the same time period. But this leaves out those areas with high numbers of people moving in and equally high numbers out. Therefore, net mobility itself does not differentiate between high turn-over places and stable places; rather, such places appear to be the same and are considered average in terms of net mobility. But variations in amount of turnover are important particularly as areas may differ significantly in terms of strength of social networks and or environmental interaction (connectedness with place). There may be differences in social support, with people in high turnover areas exerting greater demand on public and private services. With both 'in' and 'out' numbers, net ($\text{in} - \text{out}$) and gross ($\text{in} + \text{out}$) mobility can be calculated and standardized so that values can be represented and compared on a scatterplot. The scatterplot then becomes a descriptor of typologies, particularly when population data are used (see Figure 2). By using the scatterplot of standardized net and gross mobility, above and below average net mobility can be ascribed the categories of attractive and unattractive (or in this study referred to as 'luster lost') respectively. Luster lost is used instead of unattractive because it may have been

Figure 2. Net and Gross Mobility Ratings

that at one time an area was attractive and may still be attractive to other people. For example, the golden horseshoe may be attractive to young people looking for work and other opportunities while it may be unattractive to people when they get older. Areas with above and below average gross mobility can be described as transition and stable places respectively. These categories provide a framework with which to investigate the main questions regarding structural and behavioral differences with regard to quality of life.

So far there are five categories, two related to net and two related to gross mobility, as well as the area surrounding the center where average values will fall. But in addition, the scatterplot will show values that fall into the areas in the corners of the graph. These include areas with both high net and gross values, high net and low gross, low net and high gross, and low net and low gross values. Average values are considered in this study to be those which fall within one standard deviation of the mean for both mobility calculations. Refer to Table 3 for the categorization delineation and typology.

Table 3. Standardization Calculations

Z Rating Typology	Category delineation
Average (within one std dev of mean)	>-1, <1 (net&gross)
Stable	gross<-1, net <1 and >-1
Luster Lost-Stable	gross<-1, net <-1
Luster Lost	gross>-1 and <1, net <-1

The term z-rating is used rather than z-score because the data are nominalized to make up a typology. Questions of how this typology will be used to investigate structural and behavioral issues are elaborated upon further in Sections 3.7 and 3.8.

3.2 Area of Study and Time Period

The area of study is limited by the availability of data. In this case, cost limited the area to one province while interest in becoming familiar with Ontario also focused the study there. Mobility data (5 year) were acquired from the 1996 census for all CSDs in Ontario at the time of the 1996 census. An effort was made to move the study to as local a level as possible in order to improve the detail of the inquiry and to test the limits in aggregated data.

3.3 Level of Aggregation

The study begins with an exploration conducted at the Census Division (CD) level, often referred to as counties, in Ontario. This requires that the census subdivision (CSD) data be aggregated. CDs provide a more localized focus than that provided by provincial data and yet are large enough to remain unchanged over long periods of time.. Subsequently, the investigation moves to within CDs to CSDs, in order to see if there is similarity in mobility across scales. CSDs are very difficult to work with as they vary greatly in areal sizes and populations. They are also more prone to change from one census to the next, some changing their boundaries while others may be removed.

For the behavioral component, indicators of health related behavior are available from the National Population Health Survey (NPHS). These variables (found in section 3.8) have been gathered at the District Health Unit (DHU) level. DHU areas are much

larger than CDs and therefore, the mobility data are aggregated. Attempts were made to obtain data at the CD level, but this step lowered the number of respondents 65 and older per area and subsequently raised questions about the reliability of the responses to be representative of the people in the area.

3.4 Age Composition

The age cohort of interest is that of the elderly. This includes everyone 65 years of age and older. Since the elderly may move once after they retire and again in need of support, this is an awkward aggregation and perhaps narrower groupings such as five year cohorts (for example, 65- 69) would have been more effective, but absolute numbers in each for each group would also be reduced, posing other difficulties. Therefore, 65+ is used but with the appreciation that there is a great deal of internal variation in this grouping.

3.5 Mobility

The Statistics Canada definition is used here to describe mobility. It refers to the number of people who had a different residential address within Canada (internal) five years prior to the 1996 census, or May 14, 1991. For these internal migrants, both of the addresses (the old and the new) are coded and the number of people who had moved out of each CSD is established, as well as the number who had moved into each CSD. It does not show those who may have moved within a CSD or those who may have moved between CSDs more than once, including those who may have moved back. In this study, this may be important as retirees may move back as disabilities increase. Nonetheless, the choice here is to use five year mobility data which gives a greater

opportunity for more moves to be included. It should be noted that this choice increases the age group as well. Anyone who moved within the last five years, could have been as young as 60 years old on May 14, 1991. This expansion allows for early retirees to be included also. Though they may have moved before the age of 65, they were 65 or older as of the census date in 1996.

Mobility data are gathered from approximately twenty percent of the population making the numbers of respondents very low in those CSDs with few people. Concerns over how representative the samples are grow as the number of elderly drop below 250 (making the number of elderly respondents sampled equal fifty). Therefore, CSDs with small populations are examined with caution. Another reason to avoid looking at small CSDs is that the numbers are randomly rounded (up or down to the nearest five) by Statistics Canada before being disseminated. Nonetheless, CSDs within some counties are examined in the structure section to highlight the importance of scale which should not be ignored when looking at mobility and health. Examination of the z-ratings at different scales attempts to help answer whether rural and urban elderly move in the same way or to the same places.

3.6 Mobility Calculation

The number of those 65 and over who stated a different address from that of five years earlier is compared to the number living in the CSD in 1996, for the CSD level examinations. For the CDs, absolute numbers for each CSD within are added to give the total number of elderly who moved between municipalities. This same procedure is followed for the DHU level exploration of health related behavior. The number of elderly in a CSD is divided by the number who moved in, and also the number who

moved out in order to gain a percentage of mobility per area. This approach includes the people who moved both in the numerator and also, at least in part, in the denominator. For example, the number of elderly in a CSD in 1996 includes those who have moved. There are many problems with this method of calculation yet some advantages. For example, it dampens the influence of large numbers of people moving from core areas into places with smaller numbers, thus reducing their relative impact (the large number of in-migrants are also included in the total number of those 65 and over). A disadvantage is that deaths during the period are not recognized. Using 1991 figures or an average of 1991 and 1996 as the denominator has advantages, but for practical reasons this was not done for this study. Many of the CSDs from 1991 no longer existed in 1996. Nonetheless, the approach used provides the percentage of those 65 and over per area who lived in a different CSD in Canada five years earlier.

3.7 Spatial Structure

Now that mobility data management has been addressed, it will be helpful to consider how the results of the typology discussed in Section 3.1 might be used in order to examine possible structural patterns. The main question here is whether mobility varies across the province, with a particular focus on possible movement across core / periphery gradients. The examination then moves to the CSD level within selected counties to see if there are differences between retiring (but mobile) urbanites and ruralites. Two approaches are examined for their possible applications in examining urban rural variations. The first considers density gradients and the second looks at metropolitan influence zones.

3.7.1 Density Gradients

If the elderly move out of core areas, perhaps in favor of greener pastures, we should see attractive areas outside of the larger centers. On the other hand, peripheral areas may show a net out migration as there may be a pull towards core areas with services. Transition and stable areas may lay between high and low density areas. Yet urbanites may move to open spaces while ruralites move to small centers. Figure 3 illustrates the schema for residential mobility across density gradients that is referred to when examining the results.

Figure 3. Relocation orientation of urban and rural retirees

At the county (i.e., CD) level for the whole province then, there may be core/periphery dynamics which may be captured by mapping the mobility z-ratings. Mobility may also be something that is not unique to each county, but rather, there may

be some spatial ordering; where adjacent counties share similar values. Since the data have been converted to categories, the county mobility (a sum of the numbers 'in' and numbers 'out' of CSDs as a proportion of those in the CD in 1996 for that age group) is represented as discrete areas assuming internal homogeneity while being relatively different from neighbors. The results are therefore examined for spatial ordering; whether clustered, dispersed or relatively random for the mobility variable. Spatial ordering between CDs may result from the influence on counties from nearby core areas such as Toronto and Ottawa. As mentioned previously, if a small percentage of the elderly in a large centre move, their impact on the surrounding area with low numbers, may result in a large relative change. Conversely, the mobility of those out of low population CSDs may have a relatively small impact on those CSDs with large populations. If there is spatial ordering with the CDs then aggregation to the DHUs may be applicable.

A CD which appears as "Average" may have considerable internal variation and perhaps should not be discounted outright as not having important or significant mobility characteristics. For example, CSDs within a CD may be attractive or not, while some may be stable or experience high turn-over. A CD categorized as 'transition' may have both high 'in' and high 'out' mobility, as well as 'stable' CSDs. Therefore, several CDs are examined more closely by running the mobility typology, described in Table 3, for the CSDs within. CSDs include the complete range of administrative arrangements placed on areas from sparsely populated rural townships to large cities. Within CDs, the focus is on the relative attractiveness, stability etc. for rural areas represented by townships versus towns and villages.

The choice of CDs may be important in this exercise, as those with large cores may show a very different dynamic from peripheral CDs. Since the inquiry began with information from the Health Information Partnership for Eastern Ontario, the CSDs in the two DHUs in this region are examined. These include the Champlain and South Eastern Ontario DHUs. This region includes two large urban cores (Ottawa and Kingston) as well as rural districts. Townships surrounding the cores are examined to see if they are 'attractive', while in more rural areas (those farther from cores) townships may be 'unattractive' while towns and villages may be rated 'attractive' or 'stable'.

Also, it is helpful to examine CSDs within counties to see if there is a similar mobility pattern for retirees found using data aggregated to the CD level for the province. Since density gradients are thought to be important, the interest is in seeing whether high and low density areas are unattractive at both the CD and the CSD levels. CSDs can be ranked by density, and subsequently color coded in the same manner as the z-rating typology, to see whether middle density CSDs are stable and/or attractive while high and low density areas may be unattractive and/or unstable.

3.7.2 Metropolitan Influence Zones

Another method which can be used to examine core to periphery mobility is to compare net and gross values with Metropolitan Influence Zones or MIZ (Rambeau & Todd, 2000). These designations have been developed by Statistics Canada as a way of measuring the continuum between urban and rural areas. They employ 'place of work' (POW) values by CSD. Each CSD surrounding a core area is characterized by the percentage of those residents who work in the core area. Areas with more than 50% working in the core are considered to be socially and economically integrated. Areas

outside, with less than fifty percent, are outside the highest commuter flow areas. The MIZ data are used to see if the residentially mobile elderly move to places outside the high commuter flow areas. For this study, only the POW values for Kingston were acquired from the 1996 census. Therefore, POW is examined in relation to the z-rating mobility typology for the Kingston area with a view to possible patterns within the South Eastern Ontario DHU.

3.7.3 Urban /Rural interactions

While there may be a continuum between core and peripheral areas, a duality may exist within gradients or zones. By looking at socio-economic indicators, we may see to what degree urban retirees might mix with their rural neighbors. Do people who have worked in primary industries in rural settings interact with people who have worked in secondary and tertiary industries in urban areas? To explore this, the last of the structural components and the prelude to the behavioral elements, the examination moves within a CD, outside of the high influence zone of the Metro Toronto core area, in this case Prince Edward County in the South Eastern Ontario DHU. The objective is to see if urbanites and ruralites share the same settings or whether they segregate. A duality may exist at the local level within areas considered to be on a continuum at a smaller scale (covering a larger area). Using census data, periods of growth, industrial occupations, and labor activity can be compared in relation to findings from the z-rating typology.

Even if variation in mobility is found, it may still be considered unimportant with regard to health and quality of life. Therefore, health related variables are compared with net and gross mobility values .

3.8 Spatial Behavior

3.8.1 Z-Ratings with Suggested Variables

The z-rating typology can be used to explore issues of mobility for retirees not only in terms of density and proximity, but also in terms of behavior, particularly in relation to health issues. Using the same scatterplot of z-ratings, characteristics are applied to the typology and then tested to see if there are relationships between net and gross mobility, and health related variables (see figure 4). Variables used to measure indicators of health, as well as strength of social networks, can be found in the National Population Health Survey. This survey, started in 1994, has been conducted every two years since. It is composed using two methods: cross-sectional and longitudinal. For the purpose of comparison with the 1996 census mobility data, the 1996-97 NPHS cross-sectional health files are used.

3.8.2 Level of Aggregation

In order to be able to compare the NPHS with the census data, the CSD mobility data must be aggregated to DHUs. As mentioned earlier, this means bringing together several CDs to match individual DHUs. The results of the mobility ratings at the CD level should be examined to see how further aggregation might affect the interpretability of results. In particular, the joining of CDs to make DHUs may hide important internal variations, or if there is compatible spatial ordering, where CDs within a DHU share the same typology, this may not be a problem.

Figure 4. Net and gross mobility and health related behavior

3.8.3 Age cohort

Unlike the census where all residents are enumerated, the NPHS samples age groups from each DHU with differing proportions. In some DHUs those over sixty years of age may represent forty percent of the respondents, while in other DHUs those over sixty may only represent fifteen percent of the respondents. Each DHU had the opportunity to direct the study towards different age groups. In some areas, there was more interest in health issues for the youth while in others there was more interest in the elders.

3.8.4 Indicators of health related behavior

Variations in net mobility may indicate differences in types and levels of activities, as well as use of health care services. Perhaps, the greater the net 'in' value the greater the interest in health related topics and we may see more emphasis on early detection of physical problems. In the NPHS, the variable 'had a physical check up without having a problem' is used. Variations in gross mobility may relate to variations in strength of social ties and consequently may be associated with fragmented social support networks and more flexibility in choices. An indicator of flexibility in choices may be the percent of those 65+ who 'consulted with an alternative health care professional' which is also found in the NPHS health files. Other indicators of health related behavior which may be associated with mobility are listed below. These were all chosen from the NPHS 1996 – 97 cycle.

- 'Over night stays' is included as an indicator of the use of health care services and of general health. People in places with low over-night stays may be considered to be on the whole, healthier than those in areas with high numbers who said that they did

stay over night in a hospital in the past twelve months. As well, the greater the percentage of overnight stays the greater the burden on the health care system.

- Areas where those over sixty five stated that they felt that 'health care was not available in their area' may be less attractive than areas with better access.
- People who move to attractive areas perhaps for improved quality of life, may be more conscientious about health issues and therefore proactive, and interested in monitoring their health. These people may be more apt to have a 'physical check up without having a problem'.
- They may also be more 'active'. Respondents were asked to rate their levels of activity as either inactive, moderate or active. The percent who stated that they were 'active' was calculated for each DHU.

The types of activities the elderly are involved in may vary between more and less attractive areas. Such as...

- 'Walking' for exercise.
- 'Gardening' for exercise.
- 'Dancing' for exercise.
- 'Alcohol consumption' may be higher in places with fewer opportunities and is often considered to be an unhealthy activity.

Places with high turn-over levels may differ from stable areas in a number of respects.

The following were chosen from the NPHS as indicators of the strength of social networks.

- 'Membership in an organization' may be higher in stable areas.
- 'Contact with relatives' may be lower for people in transient areas.
- 'Contact with close friends' may be lower for people in transient areas.
- 'Support in times of a crisis' may be lower for high turn-over areas.
- The number of those who 'consult alternative health care providers' may be higher among people with weaker social ties, living in high turnover areas, who may therefore be more flexible and open to alternatives.

A complete list of the health related variables selected from the NPHS, 1996-97 cycle is found in table 4. Since the objective is to identify possible relationships, with an expected direction, positive and negative values are offered.

3.8.5 Tests of Association

Each of these variables is tested against both net and gross mobility for those 65 and over for possible correlations. Since the data are in the ratio form, Pearson correlation coefficients are sought. Since a direction is offered they are tested at the .05 level of significance using a one tailed distribution value. Positive (+) and negative (-) signs are given to indicate the expected direction of the correlation of the selected health related variables in relation to net and gross mobility values.

Table 4. Health related behavior indicators

Net mobility	one tailed
Over-night stays	-
Health care not available in area	-
Physical check up without having a problem	+
Those who are active	+
Those who walked for exercise	+
Those who gardened for exercise	+
Regular drinker	-

Gross mobility	one tailed
Those who danced for exercise	-
Member of an organization	-
No contact with a relative	+
Contact with close friend	-
No support in times of a crisis	+
Consulted an alternative health care provider	+

Since the CDs are aggregated to the DHU level, there are only 23 samples. This small sample set increases the confidence interval, lowering confidence levels. R values that meet the 0.05 confidence level are routinely highlighted, although, given the exploratory nature of this work, values that fall somewhat outside this level of confidence, which is commonly used in confirmatory data analysis, are also examined and the interpretable ones are commented on.

3.8.6 Response selection

All the indicator calculations included an examination of the percentage of responses which were classified 'not applicable', 'refusal', 'not stated', and 'don't know'. Only one of the variables had more than one percent with these types of responses. Those who stated that they did not know if they had 'contact with other relatives' (which ranged from less than one to eight percent) were included with those who never have contact. Although there may be many reasons for not knowing, these were included because they indicate loose or fragmented social support networks.

3.9 Summary

In order to answer the main question of whether mobility is important to consider when looking at health and quality of life issues two data sets are utilized. Net and gross mobility figures from the 1996 census are used to examine whether there is variability in mobility particularly in relation to urban and settings. In order to see if mobility is associated with health related behavior, net and gross mobility figures are compared to variables selected from the NPHS.

CHAPTER FOUR

RESULTS AND DISCUSSION

The findings and discussion are presented in two sections. First, spatial structures are examined followed by the investigation into spatial behaviors in relation to quality of life and health issues.

4.1 Spatial Structures

The section on spatial structures begins with a look at the results of the standardization of the 'in' and 'out' mobility data for those 65 years and over, from the 1996 census, in terms of both net and gross mobility. The scatterplot is followed by a map of Ontario with the CDs color coded to correspond with the z-rating typology. Again, we are looking for mobility in relation to core and periphery, and also for possible spatial ordering .

In order to see if the mobility of those over 65 is unique when compared to the overall population, results are also mapped for those in the 25 - 44 year old age group. This age group is chosen because they are said to be moving for work and in the opposite direction to retirees (Goffette-Nigot & Schmitt, 1999). Here, we are looking to see if areas that are unattractive to people 65+, are also unattractive to a younger age group.

Next, CSDs within the Champlain District Health Unit are examined using the same z-net and z-gross typology, to see if a similar dynamic exists at another scale. This is followed by results of the z-ratings against density within a CD within the Champlain DHU, in this case Renfrew County. The next method for examining core periphery mobility involves comparisons with commuter flows. Place of work data for the CSDs surrounding Kingston are compared to the z-rating typologies to indicate whether there are preferences for place outside of high commuter flow areas. Before leaving the spatial structure examination to consider behaviors in relation to quality of life indicators, z-ratings for CSDs are compared to socio-economic variables to investigate possible urban / rural contrasts. The mobility z-ratings are then compared with the variables from the NPHS in the *Behavior* section.

4.1.1 Z-ratings - CD 5yr mobility

The table of the results of the standardization process shows that Ontario experienced more 'out' mobility than 'in' mobility for those 65 and over between 1991 and 1999 (Appendix A). Since internal mobility has been used, the difference of approximately 1500 people points to moves to other destinations outside of Ontario but within Canada; BC is often considered an attractive destination. Toronto had 15,000 more people 65+ move 'out' (25,890) than 'in' (10,750) during this time period. The 'city effect' of Toronto pales in comparison to the 'rural effect' for retirees.

The impact on areas surrounding Toronto is likely very substantial, although this data set cannot tell us about origins and destinations. The assumption is that people tend to move shorter distances rather than longer distances, particularly in later years. Therefore, while the percentage of elderly moving 'out' of Toronto is only slightly higher

than the provincial average, the absolute numbers are relatively extremely high when compared to the other CDs. On the other extreme, Kenora District (refer to the Ontario CD map in Appendix B) has a very low number of elderly but, similar to Toronto, a higher percentage 'out' than 'in' (see Figure 5). Surprisingly, several of the CDs surrounding Georgian Bay (Huron, Bruce, and Grey counties) are not found to be attractive nor are they high turn-over areas, but they appear as 'average'. Recreational areas along water fronts such as those along Georgian Bay are said to be attractive to the young elderly (Foot and Stoffman, 1996). This result hides the attractiveness of places like Collingwood and other towns right on the lake shore. Perhaps movement 'in' is negated by movement 'out', but this still does not lead to a gross value of over one standard deviation. Closer to Toronto, however, Simcoe County is also on the bay and includes the Lake Simcoe shore line and scores high net and gross values.

The graphical representation of these results (see figure 5) shows points scattered in a diagonal pattern, indicating a positive correlation between net and gross mobility. Places with high net are also likely to have high turnover. The r^2 value shows that 45% of the variation in gross is explained statistically by the variation in the net values. Perhaps the people who move in also move out. Of course, there may be other things happening which cannot be seen with aggregated data; see Section 3.5. Subsequently, none of the CDs fall within the low net high turnover (upper left), nor the high net and low turnover (lower right) sectors of the scatterplot.

People 65+ find the most northerly portion of the province and Toronto unattractive (Figure 6). It appears that very low density areas share some things in

Figure 5. Scattergram of net against gross mobility for 65 years and over, CD

Figure 6 Z-rating, 65+, 5 year mobility, 1996 Ontario Map

Z Rating Categories for 65+ in Ontario, 1996: Five year Mobility

common with very high density areas. Areas immediately north of Toronto have high net and gross values, while to the west, the CDs have an average rating. Attractive areas lie in the south-central part of the province but also include Algoma. A look at the CSDs within Algoma shows that Elliot Lake was also very attractive during this time period, indicating that the efforts of the municipal administrators to attract retirees had been successful.

There appears to be a considerable degree of spatial ordering indicating a high level of contiguity of mobility rates. The south western portion of the province is relatively stable with low mobility rates, while CDs north and east of Toronto are characterized by higher mobility rates. This may be because the established agricultural areas of south western Ontario are not as accessible to movers as are the less developed and less agricultural areas north of Lake Ontario. Ottawa/Carleton is flanked by an attractive CD (Lanark) to the west, and a transition CD (Prescott/Russell) to the east. To the north, several CDs have the same net out mobility ratings while Thunder Bay is stable for those 65 and over. Sudbury also has a low gross score but even lower net rating than Thunder Bay, and therefore falls into the luster lost, low turn-over category. With regards to aggregating CDs into DHUs, the areas which border each other and share similar z-ratings can be aggregated without loss of information and at the same time improve reliability of the correlations to be run using health related variables from the NPHS. This is examined in the section on behavior.

4.1.2 Z-ratings for those 25 to 44 years of age

It is helpful to see if the mobility patterns are different for those people in other age groups. For this test, the mobility of those 25 - 44 years is standardized and another

map is generated in order to see similarities and possible differences (see figure 7). There are many differences between this group and those over 65, but also some similarities. The area around Lake Simcoe also has high turn-over. But York is attractive and Toronto is stable for those in the younger age group. Perhaps those 25 to 44 years of age are already working in Toronto, therefore it appears to be 'stable'. But some may be moving into York, making it appear 'attractive', perhaps in order to raise their children outside of the big city. In northern Ontario, the ratings are quite different compared to those 65+ with Kenora and Rainy River showing average mobility while Cochrane is stable, and Algoma and Thunder Bay have low gross and low net values. Perhaps people in the 25 - 44 years old age group are not moving as much from the high and low density areas because they already have work. The 'luster lost' areas are difficult to explain without a more in depth study but perhaps universities in these areas have influenced the results. It could be that many people between 20 and 30 years of age leave university towns after graduation. Further studies should also include a look at those between 18 to 24 as these people tend to move the most and we may see that core and possibly peripheral areas are attractive to this age group.

4.1.3 Mobility within the Champlain DHU Counties at the CSD level

The findings suggest there is mobility out of high and low density areas within the province, while some areas in between are attractive. Older, established, agricultural areas (i.e., southern Ontario) seem to be more stable, while the less established and under-populated area north of Lake Ontario appears able to accommodate retirees. Does this movement out of high and low density areas occur at a regional level? Since this

Figure 7. Z-rating, 25 - 44, 5 year mobility, 1996 Ontario Map

study began by questioning assumptions mentioned in the Health Information Partnership report for eastern Ontario, CSDs in the Champlain and SE Ontario DHUs are examined using the same standardization procedure and represented graphically using the same mobility typology and color coding.

The names of all the cities, towns, and villages in the Champlain DHU that achieved a z-rating other than 'average' are shown in Figure 8. Overall, there appears to be a difference in patterns between the core area of the Ottawa/Carleton CD and the other CDs. In the Ottawa/ Carleton CD, Rockcliffe Park remains stable while two townships surrounding Ottawa, Cumberland to the east and Goulbourn to the south west, are attractive for those 65+. Perhaps if people tend to move shorter rather than longer distances, and if people move away from core and peripheral areas, then these two townships, bordering the core area of Ottawa, have urban 'in' migrants. The other CDs in the Champlain DHU appear to exhibit different patterns.

Towards the east, in the CDs of Prescott/Russell and Stormont/Dundas (see CD map for Ontario, Appendix B) we see several townships with ratings of 'luster lost' and 'luster lost with high turnovers' while the villages of Winchester, Chesterville, Casselman, Finch, and Alexandria throughout the centre of this region are relatively 'attractive' or 'stable'. Again, if people tend to move short distances and move out of low density areas perhaps rural dwellers are moving into or staying in these small towns and villages. This leads to the consideration of the possibility that while urbanites and ruralites share an interest in moving to middle density areas, they may move in very different ways; urbanites preferring open spaces on the urban fringe, and ruralites enjoying the amenities and services of relatively central settings within rural areas. Perhaps the apparent

Figure 8. Z-rating of communities within the Champlain DHU Map

difference reflects mobility at different stages after retirement. Urban retirees may move upon retirement while rural residents may not move until their later years. Before exploring the question of whether urbanites and ruralites move to the same places, we can see if density is important to consider at the CSD level within a county.

4.1.4 Density and Mobility at the CSD level

To assess whether or not mobility varies with density, a county was selected from those within the Champlain DHU (see Figure 9). CDs with large cores and those in peripheral areas might be treated separately from CDs lying in between these extremes as they may show a different dynamic as mentioned previously. In this sample, then, Ottawa/Carleton was not included and Renfrew was chosen because of the relatively large number of CSDs with z-ratings other than 'average'. Further studies could test density with mobility using larger numbers of CDs selected from across the country. The CSDs were ranked in descending order by density using 1991 figures. Data for 1991 were used because, first, the CSD boundaries had not changed (CSDs tend to be very fluid and subject to change from one census to the next), and, second, the density in that year may have had something to do with the mobility over the next five years. All of the CSDs in figure 9 which received a rating other than 'average' are labeled. In the table found under the map of Renfrew County in Figure 9, the attractive and stable CSDs fall in the middle range of all those which achieved a rating. The higher density areas fall into the 'luster lost' and 'luster lost with high turnover' categories, while the low density areas also included these as well as two 'attractive with high turnover' CSDs. The middle density CSDs within Renfrew County are particularly attractive to the mobile elderly and also are stable, perhaps as good an indication of an attractive area as any. This is by no

Figure 9. Z-rating with density for Renfrew county Map

means a thorough test but rather points to the possibility for further studies into mobility dynamics as they relate to what constitutes an optimum population.

4.1.5 Mobility and Metropolitan Influence Zones

Looking within the Champlain DHU, we saw that there may be a difference in residential locations for migrating urbanites and ruralites. It appears that further studies into the attractiveness of middle density areas may be warranted, but should take into consideration the selective sampling of core, middle density, and peripheral areas. As mentioned, in CDs with large core areas, CSDs outside of the high commuter flow zones or metropolitan influence zones, may be more attractive for retirees than are those within high commuter flow zones. This can be examined more explicitly using place of work (POW) data (see figure 10). POW data were acquired from the 1996 census for the Kingston area which is considered to be a large core area, as it has recently achieved census metropolitan area status (CMA) with a population of over one hundred thousand people.

When the POW data are compared to the z-ratings for mobility for people over 65 in 1996, it appears that attractive CSDs lie outside high commuter flow areas and have low (between 0 and 5%) or no Kingston bound employees (commuters). The closest attractive CSD to the core has 25 to 50 % commuters, and the next has 15 - 25%. What is also interesting to consider is the pattern of CSDs outwards from Kingston. The sector to the north and the east (between Kingston and Ottawa) has several attractive CSDs, while directly north and to the west the CSDs have an 'unattractive' or 'average' rating. To the west north west, the number of attractive CSDs increases again. It would be interesting

Figure 10. Mobility and Metropolitan Influence Zones

to see if attractive CSDs diminish in number with increased distance east of Toronto. Urbanites may be looking for wide open spaces so long as they are close to services.

4.1.6 Urban/rural dichotomies - Mobility within Prince Edward County

So far, this inquiry has focused on spatial patterns in mobility with a view to considering core periphery dynamics. It appears that people from high and low density areas share an interest in finding middle density places to live while proximity to services also is important. Yet, urbanites and ruralites seem to move in different ways. The former seem to look for outlying recreational areas while the latter appear to look for towns and villages. An urban rural divide may exist in other ways. This issue is explored further by looking at labor activity and industrial occupation codes for CSDs in a CD of interest. Because Prince Edward County has an 'attractive with high turnover rating' and lies further from Toronto than the 'attractive' Northumberland County, it is examined more closely.

Here we find that all the CSDs fall within one standard deviation of the net and gross means, except for two (see Figure 11). Wellington is rated 'attractive with a high turnover' while Bloomfield is in the 'luster lost with high turnover' category. What makes these two towns so interesting is that they are only eleven kilometers from one another (see figure 11a). Wellington is a village situated on the shore of Lake Ontario adjacent to the Sandbanks provincial park. Bloomfield is also a village but is situated inland and was an active food processing town in the early part of the nineteen hundreds.

Figure 11. Scattergram of net against gross mobility, Prince Edward County

Figure 11a. Prince Edward County

4.1.6.1 Period of construction

In order to see if there has been a trend over time of 'in' mobility for Wellington and 'out' mobility for Bloomfield, the period of construction data can be examined from the 1996 census. In the 1996 census, residents were asked when the dwelling in which they reside had been built (see Figure 12). The graph may be somewhat misleading as the bars represent different lengths of time periods. The last bar represents only five years, while the first set covers fifteen years, and the others represent ten. Therefore, the number of residences built may be much higher for the full ten year period from 1991 to 2001. There has been a transition occurring on the island of Prince Edward County with growth of the retirement community of Wellington and a decline in the building construction activity in Bloomfield. The park and the waterfront may indeed be attracting retirees. Yet, it is difficult to tell from the data whether people are moving into Wellington because buildings are going up, or if on the other hand, buildings are going up because people are moving in. At the provincial scale there seems to be an overall trend away from the developed and well established southern portion of the province in favor of the 'undeveloped' areas north of Lake Ontario which may be substantiated with a survey of the mobile elderly. One may also look at the number of custom-built homes versus speculative buildings. Many of the buildings in Wellington are apartments and, though likely built on speculation, this may have been in response to demand.

4.1.6.2 Labor Activity

Wellington is an attractive area with high turn-over for those 65 and over but is it a 'retirement town'? Perhaps another way of finding such places is to check the census data for the percent of those 15 years of age and older of an area who are 'not in the labor

Figure 12. Residences built since 1945 in Bloomfield and Wellington.

Figure 13. Labor Market Activity for Bloomfield and Wellington (percent).

Figure 14. Occupations in Bloomfield and Wellington (percent in work force).

market'. Figure 13 shows that over half the population, 15 years of age and over, is not active. Note that unemployment is accounted for. Although this inactivity in the labor market may be for a broad range of reasons, the high 'net in' mobility and the labor activity data seem to support the retirement town label.

4.1.6.3 Work force

Since it appears to be a retirement town with a large percentage of people not in the work force, the people needed to provide services may not live in Wellington. Yet if the retiring elderly are moving in with enough resources to maintain a 'good' standard of living, they may be able to draw workers from surrounding areas. Perhaps health care providers who work in Wellington live nearby in areas with lower overhead costs. Also of interest is whether or not there is a mix of people who have made their living in a rural orientation and those who have worked in the city. For these questions, occupation can be checked in the census data. We see in Figure 14 that just over 40% of the Bloomfield work force, while only 20% of those in Wellington, are engaged in the primary and manufacturing industries. These data do not break down the difference between managers and the workers in these industries, which could be investigated further, but does draw attention to the possibility of spatial, as well as social and economic ordering.

With such high growth in the Wellington area, it will be interesting to see if the densification continues, and if so, 'how much is too much?' The overall density of Wellington (all age groups) increased by 16% between 1991 and 1996, by far the highest on the island of Prince Edward County, while Bloomfield's dropped only very slightly (table 5). If high density is unattractive, an important question becomes: 'is there a

Table 5. Z-ratings, Prince Edward County CSDs

1996 Census GEOGRAPHY	Population		In migrants (5 year)			Out migrants (5 year)			Z ratings				Density		
	Total	65+	Total	65 +	%IN	Total	65 +	%OUT	net	gross	znet	zgross	Density 91	Density 96	Dching
Prince Edward County	24405	4350	4940	660	15.17	3790.00	375.00	8.62	6.55	23.79			22.67	23.89	1.22
North Marysburgh	1300	250	235	20	8.00	30.00	10.00	4.00	4.00	12.00	0.01	-0.73	12.89	13.44	0.55
South Marysburgh	1030	185	210	15	8.11	155.00	20.00	10.81	-2.70	18.92	-0.50	-0.33	8.94	9.40	0.46
Athol	1375	255	270	35	13.73	210.00	20.00	7.84	5.88	21.57	0.15	-0.17	13.89	13.57	-0.32
Hallowell	4140	640	770	55	8.59	95.00	30.00	4.69	3.91	13.28	0.00	-0.66	22.50	23.68	1.18
Picton	4500	1010	875	175	17.33	1370.00	80.00	7.92	9.41	25.25	0.42	0.04	1075.00	1145.34	70.34
Sophiasburgh	2280	365	300	25	6.85	150.00	15.00	4.11	2.74	10.96	-0.09	-0.79	10.50	11.36	0.86
Hillier	1850	280	460	20	7.14	305.00	5.00	1.79	5.36	8.93	0.11	-0.91	13.10	13.45	0.34
Ameliasburgh	5570	755	1005	75	9.93	785.00	105.00	13.91	-3.97	23.84	-0.60	-0.04	27.32	28.41	1.09

threshold level beyond which demand will drop, and/or other opportunities will become more attractive'?

Prince Edward County has certainly experienced many changes over the last half century and will likely continue to evolve with the growing population of retirees. People who had retired to the island from the Niagara area, began growing grapes as a pastime. The transplants survived the first winters and now hundreds of acres are dedicated to grape growing. The area has recently been given 'grape growing' status. In addition, wine making is a new 'boom' economy for the region. Will cheese making follow?

4.1.7 Summary of Spatial Structures

An examination of spatial structures benefits from a view of the data at different scales. Looking at Ontario using county data we see that the core and periphery are important players in mobility dynamics. At this level, the built environment around the western shore of Lake Ontario can be placed in stark contrast to the northern portions of the province. Yet, a tension still seems to exist at the regional and local levels as well. The pattern seems to repeat itself across scales. As the view moves to the local level, the data begin to play tricks on the interpretation though. Percentages begin to be inflated for small numbers making CSD data difficult to work with. Also, local level administrative units are more fluid and prone to change than are CDs as exemplified by the changes in CSDs between census years. The need for verification of theoretical musing requires other means of more in depth local level investigation. Nonetheless, the patterns at the provincial level begin to give way to processes when considering the local level. Perhaps it is this combination, whether from pattern to process, or from process to pattern that leads to a better understanding of dynamics between structure and behavior.

4.2 Spatial Behavior

Many people, and in particular many human geographers, have pointed to the inadequacy of spatial analysis to tell us directly about the human condition. Its contribution, while helpful in summarizing general conditions is thought to be two dimensional, lacking depth, and fraught with over simplification. Spatial analysis is an exercise which is used more often by physical geographers. In the mean time, other orientations in human geography have raised questions about the validity of spatial analysis. The emphasis in academia recently has been on disaggregated information, which is where this inquiry began. Nonetheless, an exploration of health related behavior in relation to mobility using aggregated data proves to be a rich source of information.

In this section, the z-ratings for net and gross mobility for those 65 and over are compared to variables related to health and quality of life. Net mobility is thought to be related to types of activities, as well as concern for health (Golant, 1987), while gross mobility is thought to be related to variations in the strength of social support networks (Wenger, 1995). Weak and fragmented social support networks are said to be related to openness to 'outside' help and advice (Fisher, 1977). Flexibility and openness to outside advice may be related to acceptance or resistance to changes in health care.

4.2.1 Scatterplot of net against gross using DHUs

To make the mobility data comparable to the NPHS data, the CDs are aggregated to the DHU level. Since correlations between mobility and health related behavior are sought, the data are not categorized as they were for the structural component of this study. A scatterplot is generated using the mobility data aggregated to the DHU level (Figure 15). With fewer counts (they drop substantially from 49 CDs to 23 DHUs) the

Figure 15 Scatterplot of net against gross mobility, 65+, Ontario DHUs, 1996 Census

variability has also dropped. This reduction in variation has taken away from the spread in gross values. Further studies might look at using CD's to see if the results highlight the differences between stable and transition areas versus net differences. A difficulty with disaggregating information gathered for the NPHS at the DHU level is that the number of respondents 65 years and over per CD drops, increasing confidence intervals.

4.2.2 Isoline map of DHUs using net mobility

As mentioned, the mobility data are not converted to categories for the Pearson's correlation tests using indicators of health related behavior from the NPHS. Since a great deal of variability in the gross values is lost with the aggregation to the DHU level net mobility values alone are mapped for Ontario (see Figure 16). In order to highlight any contiguity between net mobility values for DHUs the map is generated using an interpolation program. There are many interpolation functions available but kriging is selected since it was found to show an adequate level of continuity between values. The main assumption for interpolation is that the variable being mapped is continuous. Since net mobility is a condition of an area (there are no net migrants) the results of this approach are valid, although they must be interpreted critically, as the 'attractiveness' in one area may be quite discrete from that of its neighbor. Keeping this in mind, the degree of spatial ordering can be examined to see if values are similar between neighboring DHUs. Each DHU is given a central point (x and y coordinate) and each of these central points (centroids) is given the DHUs net mobility value. The interpolation software provides estimated gradations between the DHU centroid's net mobility values.

Figure 16. Net mobility, 65+, 5 year mobility, 1996 Ontario, DHU Map

NET MOBILITY (5 year) for people 65 years of age and over: Ontario, 1996 Census.

The net values range from +5 to -5 percent mobility with red indicating high in values and dark gray indicating high out values. The areas with values within a half percent above and below zero are colored white. For the province as a whole the area to the north and west is unattractive while the south central area is very attractive. Surprisingly, there is a red dot in the northern portion of the province (which is therefore surrounded by zero values), in the Algoma DHU. Elliot Lake is responsible for this and the interpolation package has likely given values to the surrounding areas which are inappropriate. The centroid point could be moved to where Elliot Lake is (closer to the Great Lakes) and other points could be added to the surrounding area, in order to reduce the spread of the apparent undue influence of this town. Still, the assumption that Elliot Lake is discrete should not be taken for granted. But a closer look at data for this area shows that there are many unattractive CSDs near Elliot Lake. Perhaps some of the 'in' migrants are from neighboring and or northerly CSDs.

The southern portion of the province shows a great deal of spatial ordering. Interestingly, the assumption that core areas experience net out mobility is given greater credence using net values. The label of the 'golden horseshoe' appears to reflect the attitudes of those from age groups other than the 'golden agers'. Ottawa and Windsor also share these negative net traits. Simcoe County shows the highest net in values while there are gradations outwards in all directions except directly south to Toronto. Grey and Bruce Counties show some marginal net in mobility though they were given an 'average' rating (within one standard deviation of the mean) in the categorization process for CDs. The interpolated map suggests that the shore of Georgian Bay is less attractive than the inland area. A closer look shows that the population of the elderly has increased in the

CSDs along the shore, while the inland area has net out migration. The area mid way between Essex to the southwest and the metropolis on Lake Ontario is white having a net value near zero. This area is in fact stable as we know from the use of both net and gross values in the z-rating typology of CDs (Figure 6). Yet, the zone around Ottawa is also given zero net values which when we looked with the DHUs there, gives the false impression that there is relatively no mobility. For example, the 'attractive' region between Ottawa and Kingston is not seen. Mobility out of Toronto into surrounding areas seems to greatly influence the results. People seem to move outwards from metropolitan Toronto over the north side of Lake Ontario well into the Kingston region. Remembering back to the POW map for the Kingston area (Figure 10), there seemed to be attractive CDs to the west which may have been destinations of Metro Torontonians. Prince Edward County is also within range.

4.2.3 Correlation Matrix of NPHS Variables against Net and Gross Mobility

Since the net and gross values are so highly correlated, the results from tests of correlation with the NPHS variables are likely to be similar. Still, since there is some variation between net and gross values, the comparison with activity (for net) and interactions (for gross) variables is valid. Here again we can ask whether mobility comes at the cost of weakening social networks. With weaker social ties, and perhaps greater flexibility, is there an increase in the use of alternative health care services? And do activities and levels of activities differ between attractive areas and those which have lost their luster?

4.2.3.1 Table Display - Pearson's r and one tailed test.

Scatterplots showing the distribution of each of the indicators of health related behavior against net and gross mobility are found in Appendix C and D. All of the health related indicators have reasonably acceptable distributions but for access to health care which is discussed in more detail later in this section. Gross mobility is also well behaved. Net mobility on the other hand has Toronto as an outlier with almost six percent more of its elderly population moving out than moving in while the next lowest net rates run near negative four percent. Toronto is not rejected immediately but is reviewed on a case by case basis when looking at net mobility in relation to the health related indicators.

The variables from the NPHS and the standardized net and gross mobility are found in table 6. In this table, both the Pearson's 'r' correlation coefficients and the 'p' values (one tailed test) are brought together. Instead of having repeated values on both sides of the diagonal cells for the same variables, a common feature of output displays, the blue half contains the probability of having made a type one error ('p' value) if the null hypothesis (that the variables are independent) were rejected. These are included so that the r values can be separated into those that we can be confident in having a relationship at the .05 significance level (colored yellow) and the rest in which we cannot be so confident (colored red). One last note regarding the output display; because the table includes both the 'p' and 'r' values, correlation figures for any two variables must be sought in two steps, first finding the 'r' using the columns then the rows, and secondly finding the 'p' using rows then the columns.

Table 6. Pearson Correlation with one tailed significance level (.05) for NPHS variables with mobility. N=23

		Structure and activity variables						Interaction (social) and worldview?				Mobility		
		Overnight patient	Health care not available	Physical check up without health problem	Those who are active	Those who walk for exercise	Those who garden for exercise	Regular drinker	Those who danced for exercise	Member of an organization	No contact with close friend	No support in times of crisis	Consulted alternative health care provider	In - out mobility
Overnight patient		.				0.36				0.44				
Health care not available		0.48	.			-0.40					0.40			
Physical check up without health problem		0.27	0.06	.	0.42	0.37						0.55		0.42
Those who are active		0.15	0.10	0.02	.	0.36					-0.43			0.42
Those who walk for exercise		0.04	0.03	0.04	0.04	.								
Those who garden for exercise		0.13	0.30	0.34	0.44	0.09	.						0.38	
Regular drinker		0.20	0.07	0.07	0.02	0.03	0.32	.			-0.43			
Those who danced for exercise		0.16	0.11	0.47	0.12	0.31	0.09	0.39	.		-0.35			
Member of an organization		0.02	0.07	0.15	0.30	0.36	0.16	0.09	0.35	.	0.44			
No contact with relative		0.50	0.16	0.40	0.10	0.48	0.11	0.44	0.12	0.31	.			
Contact with close friend		0.24	0.03	0.36	0.02	0.15	0.25	0.02	0.05	0.02	0.05	.		
No support in times of crisis		0.41	0.16	0.15	0.35	0.44	0.19	0.48	0.14	0.27	0.27	0.39	.	-0.56
Consulted alternative health care provider		0.14	0.27	0.00	0.40	0.32	0.11	0.47	0.23	0.06	0.09	0.40	0.23	0.49
In - out mobility 65+		0.34	0.45	0.24	0.46	0.23	0.04	0.39	0.19	0.38	0.35	0.35	0.00	0.78
In + out mobility 65 +		0.29	0.49	0.02	0.02	0.47	0.14	0.14	0.22	0.13	0.17	0.11	0.00	.

The chance of making an error in stating that there is a correlation

Pearson correlation coefficient (less than 95% confidence)

Pearson correlation coefficient (greater than 95% confidence)

Given the exploratory nature of this inquiry, the values which fall outside of the .05 confidence level will not be excluded out right, particularly those which may show a pattern. Higher p values does not necessarily mean that variables are not correlated but rather that increasing the sample size may be warranted.

4.2.3.2 Net and gross mobility

Looking first at the mobility variables in the last two columns, we see that there are some correlations with the NPHS variables. Surprisingly though, there are significant differences between net and gross values against some of the behavior variables. For some reason those getting a 'physical check up without having a problem' and 'those who are active' are related to 'gross' but not to 'net' mobility. On the other hand, 'those who garden for exercise' is related to 'net' but not 'gross' mobility. The 'r' value for 'garden' and 'gross' is .24 with a 14% chance of making a type one error if the alternative hypothesis (that there is a positive correlation) were accepted. This and the 'net' variable 'r' values might be strengthened with a larger sample set. With this example showing the marginality of 'r' values below .35, the importance of larger samples for close calls will be assumed hereafter.

But why then do the 'p' values jump so high for the 'physical' and 'active' variables against 'net' mobility? In both cases, when the scatterplots of net against the NPHS variables (Appendix C), and the scatterplots of gross against NPHS variables (Appendix D) are examined, the patterns are nearly identical but for Toronto. In the gross scatterplots, Toronto is hidden amongst other points, but with such a low net mobility, it stands out in both the 'physical' and 'active' scatterplots exerting an inordinate effect on

the regression line. If Toronto were removed, (tempting to many Canadians), the 'r' value for net mobility would be similar to that of the gross values.

4.2.4 Perceptions in responses to the NPHS

The Toronto and Thunder Bay/ Kenora/ Rainy River DHUs share low net values (both areas having lost their luster) while having very different 'physical check up' and 'activity' values. Perhaps there are opposite things happening here. It could be that reduced 'physical check ups' may be related to reduced 'access to health care'? But what of activities? It seems surprising that Torontonians are ranked the highest in activity for those over sixty five while Thunder Bay, Kenora, and Rainy River are ranked lowest. It may be helpful to consider that these values are derived from the respondent's own classification. It could be that ruralites who had been very physically active in their youth consider themselves less active in later years and that urbanites who had been less active in their youth consider themselves more active in later years. Or perhaps they are indeed what they have stated, having had enough of the former lifestyle. These concerns regarding the subjective nature of the responses may be unwarranted but it is always important to take into consideration the influence of perceptions. Nonetheless, these differences in activity levels deserve a closer look in further studies. But, the issue of differences in 'access to health care' will be taken up later in this inquiry.

4.2.5 Proactive and activity

The assumption that mobility may be related to increased concern over quality of life and therefore related to health issues seems to be verified. If people are moving for an improved quality of life, then being proactive about health seems to make sense.

Having a 'physical check up without having a health problem' reflects an interest in maintaining good health, and has an 'r' value of .42 for gross mobility (and net when Toronto is removed) . With this proactive attitude, these people in attractive areas with high turnover consider themselves to be active, also with an 'r' value of .42 for gross mobility (and net again when Toronto is removed). Of all the different types of activities included in the matrix only gardening is significantly related to net mobility, with an 'r' value of .38. A positive correlation should not be surprising since gardening is a preferred retirement activity but should this not be shared by all retirees, whether they move or not? Looking back to the structural (environmental?) findings, both core and peripheral areas are not attractive and neither of these areas are known to be particularly good for a gardening hobby. Core areas have little room for gardening, though community gardens are being slowly implemented, and the north of the province may be less than hospitable. People in northern areas may engage in other activities such as hunting and fishing. The type of physical environment conducive to gardening may be attractive, with the retirees turning their interests into reality. Looking back to the example of the grape growing in Prince Edward County, it should be interesting to see the changes in the landscape, particularly north of Lake Ontario, with the growing number of mobile retirees.

4.2.6 Social support

Looking down the mobility columns in the correlation matrix (table 6) to the next correlations in which we can be at least 95% confident, we see that there is indeed 'support in times of a crisis' for those who are mobile. It was supposed that social networks would be weaker for the mobile elderly and therefore there would be less

support. But the question in the NPHS does not address numbers and density of a social network but rather it asks if there is some one who can be counted on in times of a crisis. Therefore, the high positive correlation (taking away the double negatives) of $\sim .55$ suggests that the mobile elderly travel in couples. Looking at the scatterplot for 'gross mobility' and 'support' (Appendix D), the points are well behaved and have an overall watermelon shape. Perhaps, the greater the number of single elderly, the less the mobility; while an increase in the number of couples seems to result in an increase in mobility at least between CSDs aggregated to DHUs. These numbers may also indicate the possibility that the young elderly move together for recreation while later only one moves again, but for support. This research hypothesis deserves further study.

4.2.7 Flexibility

The last variable showing an association with both net and gross mobility is 'consulted an alternative health care provider' (Figure 17). The assumption had been that the mobile elderly would have weaker social support networks and therefore would have more flexible attitudes and would be more open to alternatives and perhaps less resistant to change. This variable has a correlation of over .5 making it the strongest with mobility. Perhaps, the flexible mobile elderly are open to alternatives and are also more health conscious. Looking down the column for 'consulted an alternative health care provider' the only other variable that is confidently considered dependent is 'had a physical check up without having a problem'. It may be that the people who have check ups without having a health problem also tend to consult alternative health care providers. This seems to make sense as they may be health conscious and, as relates to mobility at least, flexible. But this relationship cannot be determined from a correlation.

Figure 17. Scatterplot of Alternative Health Care against Gross Mobility

Figure 18. Scatterplot of Over-night stays against Alternative Health Care

Figure 19. Use of Alternative Health Care by People in Broad Age Groups

Curiously, 'alternatives' has the strongest negative correlation to over night stays at -0.24 with an eighty six percent chance of making an error in stating that they are not related. Over night stays is an indicator of the use of the health care system. The greater the number of over night stays the greater the burden on the health care system. It appears as though an increase in the use of alternative health care may reduce costly over night stays and possibly other medicare services. Perhaps, this too should be investigated further, if only to see whether this may lead to ways of reducing the burden on health care services felt in both the city and the country.

A scatterplot shows that areas with above average use of 'alternatives' by all age groups have below average over-night stays for those 65+ (Figure 18). It is interesting to consider the possible influence of the younger generations on this behavior, whether through communication of sentiments with the elderly, or as the result of an increase in the availability of such services due to increased demand, or both.

As mentioned earlier, it is important to consider the possible difference in attitudes between era and age cohort (do demographics really explain two thirds of everything, or are we reflection of our times?) Will people over 65, whether mobile or not, continue to consult alternative health care providers in favor of 'modern medicine'? Or will a generation of people who have increasingly affiliated themselves with 'holistic medicine' carry their orientation beyond the age of 65 (if they make it)? First, though, is there a difference in the use of alternatives between age groups? The null hypothesis is that there is no difference. A t-test, using the NPHS data, shows that indeed there is with less than a 5% chance of making an error in saying that there is a difference. The mean of the 65+ age group is less than 4% while the mean of the other age groups is well above

5% using a 95% confidence interval (see figure 19). Although the percentage of users is low, the opportunity to lower costs for health care which alternatives may provide, further studies may be worthwhile. When the two outliers with lowest use of alternatives (Hamilton & PR/SDG/R) are removed, a regression yields an r^2 of .16 with a drop in overnight stays as use of alternatives increases. The decisions behind these actions can only be speculated on with these data and at this level of aggregation, requiring a closer examination.

Mobility seems to have something to say about almost all of the other variables chosen and perhaps should be run with a large number of DHUs. Not surprisingly, 'contact with close friends', and 'membership in organizations' drops as mobility increases indicating weakened and fragmented social support networks. Several of the correlations between variables other than net and gross mobility are also of interest (for example, overnight stays for members of organizations), but will not be elaborated upon here. Rather, attention is directed to the zero 'r' value for mobility against 'health care not available'. It would be reasonable to expect that access to health care would be positively correlated with net mobility. The assumption is that access to health care would be important to the mobile elderly. It seems surprising that access to health care appears not to be important when deciding upon a retirement location.

4.2.8 Health care not available in the area.

Looking back to the results in the structure section, it appeared as though people moved out of low density and peripheral areas in favor of towns and villages, possibly in search of amenities and services that might be found there. On the other hand, people may be moving out of the large cities, with no lack of access to health care, to escape the

high density. If this is the case, then a linear regression may show that access to health care has no relationship with net mobility (while core and periphery have low net and gross values, they also have very different levels of access to health care). The next question then is: "is there variability in the percent of those over 65 who say that they do not have access to health care." Table 7 shows a large range of values, from 0 to over 45% of those within Ontario, who state that they do not have access to health care.

Table 7. Those over 65 who state that Health Care was Not Available

Health care not received - N/A in area (DHU)	65+
OTTAWA CARLETON	4.35
P-R/S/D/G/RENF	0.00
L/L/G/H/PE/F/L/A	0.00
N-UMBER/V/H/P	8.70
DURHAM	28.57
PEEL	22.22
METRO TORONTO	3.70
YORK	8.33
SIMCOE	14.29
HALTON	0.00
NIAGARA	4.76
HAMILTON-WENTW	5.88
BRANT/HALD/NORF	15.79
WELLINGTON, DUFF	22.22
WATERLOO	33.33
ESSEX	13.33
LAMBTON, KENT	11.11
ELGIN/MIDD/OXF	15.79
BRUCE/GREY/P/H	35.29
ALGOMA, COCHRANE	11.76
MANITOULIN, SUDB	20.00
TIM/MUSK/PAR/N	38.46
TH BAY/KEN/RAINY	46.67

A histogram of the percent of those 65+ who say that health care is not available in their area shows some bimodality (Figure 20). Within Ontario there are two distinct frequency distributions, one with an average around 10%, and the other with an average near forty percent. Those DHUs found in the upper grouping are highlighted in the table

Figure 20. Histogram of Availability of Health Care

Figure 21. Net Mobility against Health Care Not Available

Figure 22. Net Mobility against Health Care Not Available (without cities)

above. The most northerly DHU has the highest percentage of those who stated that they do not have access to health care. This seems to make sense at least geographically as this is a 'peripheral' area to the core activities of health services.

Algoma, Cochrane and Manitoulin, Sudbury are not in the high percent group though and this may be due to any number of reasons. Perhaps the population in these DHUs are less dispersed or the provision of health care from hospitals in these areas extends further afield. Timiskiming/ Muskoka which is now considered to be in northern Ontario rates highly as does its neighbor Bruce/Grey which may also make geographic sense as they do not have large centralized service (including health) provision cores. Curiously though, Waterloo is also in this group. Bunting (1999) mentioned that the dispersed city form of this region came at the cost of the provision of services. Perhaps this dispersion can be related to fragmented social support networks which in turn may partially explain why this DHU has the second highest use of alternative health care services in the province. Only York ranks higher. The dispersed form may be populated enough to accommodate venues where local needs can be met by alternative health care providers and other minor health care services.

The high net out mobility from Thunder Bay, Kenora, Rainy River and from Timiskiming/ Muskoka may be related to the lack of access to health care. Algoma and Sudbury have average access to health care comparable to the rest of the province. A look at a scattergram of net mobility against access to health care shows that there is no relationship (Figure 21). But, as mentioned earlier, the inclusion of all the DHUs may not be appropriate. The larger cities do have a low percent of those saying that there is a lack of access to health care and also net out mobility as do several of the peripheral areas

of the province. Let us take a look at the previous regression without the large cities, which we know have a negative net mobility rating from the net mobility map (Figure 15). These include the DHUs of the golden horseshoe including Toronto, Peel, Hamilton / Wentworth, as well as Ottawa, and Windsor in Essex, and Sarnia in Lambton/Kent. This results in the following scattergram and an r^2 of 0.16, which is still very low but begins to show some correlation and may be an important way of organizing the data for further tests (Figure 22).

4.2.9 Summary of Spatial Behavior

Surprisingly, even with the low number of sample areas, many correlations were found between mobility and the indicators of health related behavior. An understanding of spatial structures also helped with the analysis. The concerns regarding mobility in neighborhoods and how this reflected in variations in health related behavior and, in particular, social support networks is supported using DHU level data. Therefore, mobility is important to consider when looking at health, particularly for those sixty five and older.

CHAPTER 5

CONCLUSION

5.1 Mobility and Quality of Life

It appears as though mobility is important to consider when looking at health and quality of life issues for the elderly. There is a considerable degree of variation in mobility between places. Movement between urban and rural areas (across density gradients) is particularly revealing. Mobility is correlated with many aspects of health related behavior. Yet, health care policies developed today may not be applicable to the next generation of elderly (Golant, 1987). Indeed, alternative health care may be more acceptable to the next generation of elderly.

5.2 Methods

The use of both gross and net values provided greater insight into the dynamics of mobility and quality of life than the use of net mobility alone. Important information was added by looking at the results of the z-ratings at different levels of aggregation. The regional level highlighted differences between large cores and peripheral areas. Although confidence intervals increase with the disaggregation of data, local level dynamics can be

highlighted through comparisons with socio-economic variables. Nonetheless, local level verification of the results would add considerably to this inquiry.

Methods used to calculate the percentage of elderly movers (as 20%) may not reflect the true extent of mobility (Che-Alford, 1998). Rather, it appears as though most people move at least once after the age of 60. Increasingly, more retirees may be interested in and capable of moving. When combined with the growing proportion of elderly, impacts on the environment and communities, as well as on health care services, will likely be substantial. In Ontario, the area north of Lake Ontario seems to be particularly attractive. Surprisingly, this area does not have a rural health network in place (Health Services Restructuring Commission, 2000).

5.3 Urban / rural interactions

Mobility patterns are different for different age cohorts for Ontario confirming the findings of Goffette-Nigott & Schmitt (1999). Yet, little is said in the literature about mobility out of peripheral areas. For the elderly, core and peripheral areas are generally not attractive. Middle density areas in close proximity to central services and rural settings seem to be favored. Retirees tend to move out of high and low density areas but may not move to the same retirement locations. The dualism found in cities by Mollonkopf & Castells (1991) may be perpetuated in retirement communities.

Young elderly urban retirees may be moving as couples for recreation (Moore & Rosenberg, 1997). The correlation between gross mobility and support in times of a crisis may be because the mobile elderly move as couples. A second move may occur later for support. Rural retirees may not move until support is needed.

Metropolitan influence zones appear to have great potential for future studies in mobility and quality of life. Areas outside of high commuter flow zones appear to be attractive, particularly those near parks and conservation areas. Dispersion is tempered by the need for services available in cores. Arteries extending from cores into peripheral areas provide opportunities to live in the best of both worlds.

5.4 Health related behavior

Levels of acceptance and resistance to changes may be better understood when mobility is considered. Mobility indicates some degree of flexibility in acceptance of alternatives. Urban/rural contrasts shed light on orientations in attitudes. Alternative forms of health care may be more acceptable to urbanites while technologies which enhance information exchange may be more acceptable in rural and remote areas. Retirees moving from core areas may prefer alternative forms of health care while rural retirees moving to small centres may prefer improved technologies.

Primary care is being promoted as a way of providing health care services at a lower cost particularly in rural areas (HSRC, 2000). Primary care may be more acceptable in stable areas where doctors and patients have time to get to know each other. In rural areas issues of privacy may not be of as great a concern as they are to urbanites. The bulk of the research highlights the potential of technological improvements although an increased role for general health care providers including nurses and midwives may help reduce costs.

Primary care as indicated by physical check up appears to be attractive to people who are health conscious and interested in 'healthy' life styles. The greater emphasis on general practice and quality of life leans towards holistic views of what makes up health.

For retiring urbanites, quality of life includes contact with nature as they move out of core areas and engage in out door activities such as gardening. Also, alternative forms of health care are utilized. The strongest negative correlation for overnight stays is with the use of alternative health care. Perhaps not surprisingly, areas which have high use of alternatives for all age groups have low over night stays for the elderly. The correlation between alternatives and mobility may reflect preferences of females. This orientation may increase for males as the next generation, the baby boomers, grows old. Policy makers should consider tax exemptions for the use of alternatives as a way of reducing stress on the health care system. Exemptions should also include technological improvements. Future work might look at the use of quantitative methods in appraising the effectiveness of various alternative health care services.

Variations in concentration and dispersion provides a helpful framework with which to consider health and quality of life both in terms of structure and interaction. Structures are developed in order to facilitate interaction providing continuity between the extremes of core and periphery. The greater the movement between dispersion and concentration of human population, the greater the interaction between core and periphery but at the expense of local ties. Although the r values for 'contact with close friend' and 'no contact with relatives' fell just outside of the .05 confidence level, they do point to a pattern confirming Wenger's suggestion that social support networks become extensive but fragmented for the mobile elderly. Movement away from core areas favor natural conditions, while moves toward cores favor human standards. It appears that attitudes and activities vary between the extremes, as do those of the newcomers and the locals.

5.5 Future Research

The exploratory orientation of this study has led to many interesting areas for future research. Some of these are methodological while others are of a substantive nature. Addressing methodological issues would help clarify the strength of the arguments presented. These issues and some of the more relevant substantive issues are listed below.

Methodological issues

- **Mortality – Deaths are missed in this study yet are obviously very important to take into consideration. It is highly unlikely that deaths per age group are shared equally among all areas. Mortality rates should be examined in relation to the mobility findings to see how they might have impacted on the results. It would also be interesting to see variations in distributions of deaths by different causes by age group--for example, cancer rates.**
- **Reliability of census data – At the census division level, census data for mobility appear to be very reliable, but as the study moves to the local level, the number of respondents drops substantially, casting doubt on whether figures are representative. Other variables can be used from the census such as percentage of those in the labor market to focus on retirement communities, but other sources may be helpful in determining level of mobility. When moving to the local level, perhaps municipal records, health registries, or driving license records could be used. By checking several sources, figures could be calculated using triangulation.**

- **Structure and behavior** – This study was conducted using two equally important components. Together, these did provide interesting results. Yet, there is a great deal of discussion on how these elements work and do not work together. There may be other approaches which would work even better. This study looked at structure in terms of urban and rural settings and behavior in terms of strengths of ties and relationships or interactions. Often, behavior is looked at in terms of cognitive processes and actions. The focus on interactions, both socially and with the physical environment, juxtaposed with structure may prove to be a potent way of uncovering important issues.

Substantive topics

- **Alternative health care** – There is a great deal of interest in the use of alternative health care. This category covers many different techniques, some of them more effective than others. An important exercise would be to study these approaches for their effectiveness. For those practices that are helpful even for the few individuals, policies might be implemented that do not discourage their use.
- **Rural retirees** – The absolute figures draw attention to retirees vacating core areas. Yet, retirees in rural areas may represent a larger proportion of the population in small towns and villages. Funding may be more likely to follow the large urbanite migration than the rural migration. Improved technologies such as telemedicine may provide an important service for people and health care providers in rural settings.

- **Local level – Lastly, in order to further the understanding of mobility and quality of life, studies are required at the local level. It needs to move from the aggregated to disaggregated level. Case study approaches of the people in towns like Wellington and Elliot Lake would greatly expand the understanding of ‘who is doing what’ and ‘why’.**

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Appendix A Z-ratings for Ontario CDs - 5 year mobility, 1996 census

CD	GEOGRAPHY	65+	In	Out	%In	%Out	net	gross	z-net	z-gross
	Ontario	1246660	93085	94550	7.47	7.58				
1	Stormont, Dundas & Glengary U.C.	15275	1215	910	7.95	5.96	2.00	13.91	0.28	-0.54
2	Prescott & Russell U.C.	6390	670	755	10.49	11.82	-1.33	22.30	-1.00	1.15
3	Ottawa-Carleton Reg. Mun.	74230	5380	5870	7.25	7.91	-0.66	15.16	-0.74	-0.29
4	Leeds & Grenville U.C.	14025	1350	900	9.63	6.42	3.21	16.04	0.75	-0.11
5	Lanark County	8070	970	545	12.02	6.75	5.27	18.77	1.54	0.44
6	Frontenac County	17285	1370	975	7.93	5.64	2.29	13.57	0.39	-0.61
7	Lennox and Addington County	4795	445	375	9.28	7.82	1.46	17.10	0.07	0.10
8	Hastings County	17105	1510	1310	8.83	7.66	1.17	16.49	-0.04	-0.02
9	Prince Edward County	4350	660	375	15.17	8.62	6.55	23.79	2.04	1.45
10	Northumberland County	12295	1500	980	12.20	7.97	4.23	20.17	1.14	0.72
11	Peterborough County	20000	2120	1510	10.60	7.55	3.05	18.15	0.69	0.31
12	Victoria County	11605	1845	1405	15.90	12.11	3.79	28.01	0.97	2.30
13	Durham Reg. Mun.	38625	5390	3450	13.95	8.93	5.02	22.89	1.45	1.27
14	York Reg. Mun.	46295	6660	4640	14.39	10.02	4.36	24.41	1.19	1.58
15	Toronto Metropolitan Mun.	301435	10750	25890	3.57	8.59	-5.02	12.16	-2.43	-0.90
16	Peel Reg. Mun.	58640	5920	5620	10.10	9.58	0.51	19.68	-0.29	0.62
17	Dufferin County	3930	700	415	17.81	10.56	7.25	28.37	2.31	2.38
18	Wellington County	19000	1865	1530	9.82	8.05	1.76	17.87	0.19	0.25
19	Halton Reg. Mun.	35485	3735	2815	10.53	7.93	2.59	18.46	0.51	0.37
20	Hamilton-Wentworth Reg. Mun.	62445	3100	3365	4.96	5.39	-0.42	10.35	-0.65	-1.26
21	Niagara Reg. Mun.	59875	3600	3365	6.01	5.62	0.39	11.63	-0.34	-1.01
22	Haldimand-Norfolk Reg. Mun.	13340	1055	785	7.91	5.88	2.02	13.79	0.29	-0.57
23	Brant County	14695	805	720	5.48	4.90	0.58	10.38	-0.27	-1.26
24	Waterloo Reg. Mun.	40990	3185	2530	7.77	6.17	1.60	13.94	0.13	-0.54
25	Perth County	9535	765	650	8.02	6.82	1.21	14.84	-0.02	-0.36
26	Oxford County	12970	1060	875	8.17	6.75	1.43	14.92	0.06	-0.34
27	Elgin County	9860	685	670	6.95	6.80	0.15	13.74	-0.43	-0.58
28	Kent County	14290	810	855	5.67	5.98	-0.31	11.65	-0.61	-1.00
29	Essex County	42245	1840	2135	4.36	5.05	-0.70	9.41	-0.76	-1.45
30	Lambton County	17470	1145	925	6.55	5.29	1.26	11.85	0.00	-0.96
31	Middlesex County	44885	2625	2315	5.85	5.16	0.69	11.01	-0.22	-1.13
32	Huron County	9555	840	690	8.79	7.22	1.57	16.01	0.12	-0.12
33	Bruce County	9680	1020	1025	10.54	10.59	-0.05	21.13	-0.51	0.91
34	Grey County	13770	1495	1100	10.86	7.99	2.87	18.85	0.62	0.45
35	Simcoe County	39865	6465	3985	16.22	10.00	6.22	26.21	1.91	1.94
36	Muskoka District Mun.	8295	935	730	11.27	8.80	2.47	20.07	0.46	0.70
37	Haliburton County	3310	375	330	11.33	9.97	1.36	21.30	0.03	0.95
38	Renfrew County	13120	1090	945	8.31	7.20	1.11	15.51	-0.06	-0.22
39	Nipissing District	10050	780	845	7.76	8.41	-0.65	16.17	-0.74	-0.09
40	Parry Sound District	6715	755	785	11.24	11.69	-0.45	22.93	-0.66	1.28
41	Manitowlin District	1710	150	100	8.77	5.85	2.92	14.62	0.64	-0.40
42	Sudbury District	2795	240	275	8.59	9.84	-1.25	18.43	-0.97	0.37
43	Sudbury Reg. Mun.	17945	780	1085	4.35	6.05	-1.70	10.39	-1.15	-1.26
44	Timiskaming District	5130	375	550	7.31	10.72	-3.41	18.03	-1.81	0.29
45	Cochrane District	9140	420	680	4.60	7.44	-2.84	12.04	-1.59	-0.92
46	Algoma District	16120	1580	935	9.80	5.80	4.00	15.60	1.05	-0.20
47	Thunder Bay District	19050	595	790	3.12	4.15	-1.02	7.27	-0.88	-1.89
48	Rainy River District	3205	160	240	4.99	7.49	-2.50	12.48	-1.45	-0.83
49	Kenora District	5790	295	400	5.09	6.91	-1.81	12.00	-1.19	-0.93

Appendix B

Census Divisions in Ontario - 1996

No.	CD
1	Stormont, Dundas & Glengary U.C.
2	Prescott & Russell U.C.
3	Ottawa-Carleton Reg. Mun.
4	Leds & Grenville U.C.
5	Lanark County
6	Frontenac County
7	Lennox and Addington County
8	Hastings County
9	Prince Edward County
10	Northumberland County
11	Peterborough County
12	Victoria County
13	Durham Reg. Mun.
14	York Reg. Mun.
15	Toronto Metropolitan Mun.
16	Peel Reg. Mun.
17	Dufferin County
18	Wellington County
19	Halton Reg. Mun.
20	Hamilton-Wentworth Reg. Mun.
21	Niagara Reg. Mun.
22	Haldimand-Norfolk Reg. Mun.
23	Brant County
24	Waterloo Reg. Mun.
25	Perth County
26	Oxford County
27	Elgin County
28	Kent County
29	Essex County
30	Lambton County
31	Middlesex County
32	Huron County
33	Bruce County
34	Grey County
35	Simcoe County
36	Muskoka District Mun.
37	Haliburton County
38	Renfrew County
39	Nipissing District
40	Parry Sound District
41	Manitoulin District
42	Sudbury District
43	Sudbury Reg. Mun.
44	Timiskaming District
45	Cochrane District
46	Algoma District
47	Thunder Bay District
48	Rainy River District
49	Kenora District

Appendix C (a). Scatterplot of Overnight Stays against Net Mobility

Appendix C (b). Scatterplot of Health Care Not Available against Net Mobility

Appendix C (c). Scatterplot of Physical Check Up against Net Mobility

Appendix C (d). Scatterplot of Active against Net Mobility

Appendix C (e). Scatterplot of Walking against Net Mobility

Appendix C (f). Scatterplot of Gardening against Net Mobility

Appendix D (a). Scatterplot of Dancing against Gross Mobility

Appendix D (b). Scatterplot of Member of an Organization against Gross Mobility

Appendix D (c). Scatterplot of No Contact with Relative against Gross Mobility

Appendix D (d). Scatterplot of Contact with Close Friend against Gross Mobility

Appendix D (e). Scatterplot of No Support in Times of aCrisis against Gross Mobility

Appendix D (f). Scatterplot of Alternative Health Care against Gross Mobility